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SCIENCE FICTION

Reg. U. S. Pat. Off.

APRIL 1949
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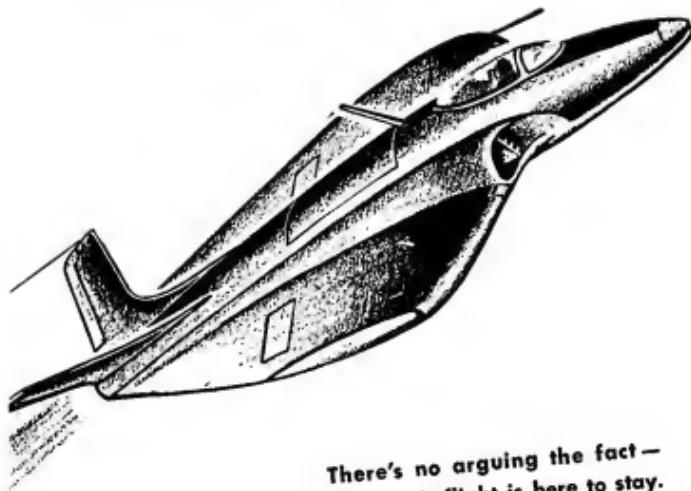
SCIENCE-FICTION

APRIL 1949



PLAQUE!
BY RENÉ LAFAYETTE

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Astounding SCIENCE FICTION

Reg. U. S. Pat. Off.

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AST-1E

“OH KING, LIVE FOREVER! . . .”

At some point in the history of the world and the history of medical science, a point will be reached such that a child born at that time can, if he chooses—and has reasonable luck so far as mechanical damage goes—live practically forever. This point in time will be some forty or more years before the perfection of the full requirements for continuous life—and this point may already have passed, without our knowing it.

For it is inherent in the nature of things that the critical birth-period can not be known until after the event—until *after* the perfection of the final techniques. Modern medical techniques have been developed to a high point—and on an exponential curve of progress, as is normal in an advancing science—with a view to keeping children and young adults happy, healthy and reasonably sane. The rise in the average-age-at-death statistics has been largely influenced by the diminution of infant and young-adult mortality; medical science has been devoting the greater measure of its efforts to that end of the problem.

Now, with an increasingly older

population group, with increasing masses of people in the older age brackets as their biggest problem, systemic failure type medical problems, rather than acute infectious problems will predominate. Heart disease takes the place of diphtheria; cancer replaces tuberculosis. Childbirth fever is vanquished—the problem is hardening of the arteries. Pediatrics is a well-advanced science; gerontology, its opposite number, is practically an unexplored field.

The first achievements of an advancing study of “old age and why is it” will naturally be concentrated on the typical conditions that kill the aged—systemic failure troubles such as heart and artery breakdowns. Of course, the only real cure for the systemic failures of the aged is the very simple and obvious one—youth. Not chronological youth, but metabolic youth. Research must be done on that problem, and is being done. The efforts being made at any time will, of course, be basically palliative—treatments that are primarily symptomatic. The obvious symptom of trouble is heart disease; the

cause is old age. The medical profession assures itself that it isn't out to find the secret of eternal youth—simply to cure heart disease. But if it succeeds in cleaning up all the symptoms, one by one, the sum total of the results must, necessarily, be metabolic youth.

Some of the more forthright researchers are headed directly toward the more all-inclusive goal of extended maturity—i.e., extended youth. The two groups of researches will, inevitably, meet on a middle ground of success, sooner or later.

For the present and near-future, say twenty years hence, we can expect some very real extensions in active life span, before the onset of the symptoms which, collectively, are termed "old age," and, simultaneously, a successful attack on the more outstanding problems of old age. The combined effect may be to extend the useful period of life as much as thirty years. Certainly not a figure to be confused with "eternal youth"—but pleasant none the less.

During the next succeeding years, incidentally, progress may well be at a faster rate. If the maturity-extension techniques are applied to the research workers themselves—naturally!—the experience and ability gained in the previous years of work will be available to aid in further advances. Instead of spending thirty-five years learning how, and then twenty-five years doing research, a man with an added thirty years of life would be a far more

efficient unit of civilization; a non-producer for thirty-five years, he could be a producer for fifty-five!

And the great problem really can't be very extreme; the human metabolism is already so nearly perfectly balanced that it takes many decades of very slow accumulation of imbalances to bring on old age. So small a factor of failure certainly should be correctable—and a small advance should mean a large improvement. With the accumulated knowledge and techniques of the previous research, the second twenty years of work might well see a further extension of maturity by another couple of decades.

The first advance of thirty years would be no "eternal youth" treatment. But—science tends to advance exponentially. That thirty-year reprieve might give just the time needed for research to extend your life another forty years. And that forty years might—

We don't know, nor can we guess now, when in time that critical point will arrive—or *has arrived*. But somewhere in history there must come a point such that a child born then will be just passing maturity when the life-extension techniques will reach the necessary point. They will grant him a series of little extensions—each just sufficient to reach the next—until the final result is achieved.

I wonder if that point has been passed? And my own guess is—it has.

The Editor.

PLAQUE

BY RENÉ LAFAYETTE

It's easy to forget what a devastating thing an old, almost forgotten, seemingly minor weapon can be. Only a man as old as Ole Doc Methuselah would know—

Illustrated by Cartier

The big ship settled in the landing cradle, her ports agleam—and her guts rotten with sickness.

There were no banners to greet her back from her Spica run, there was no welcoming mass of greeters. The field was as still as an execution dock and the black wagons waited with drivers scared and the high yellow blaze of QUARANTINE hung sickly over all.

Five hundred and ninety-one passengers were dead. The remainder of her list would probably die. Officers and crew had contributed to the dead. And somewhere between Spica and Earth, corpses had been flung out the airport to explode in vacuum and gyrate, then, perhaps, as dark comets of putrescent matter around some darker star.

The medic at the port, authoritative but frightened, barked into

the speaker, "Star of Space ahoy! No personnel or equipment will be given to you until a full accounting of symptoms has been given by your ship's doctor."

An officer's voice speakered out from the *Star of Space*. "The doc's dead! Let us open the ports! Help us!"

"How does the disease appear to you?"

There was a long silence and then another voice answered from the stricken *Star*. "Begins with sore throat and spots inside the mouth. Swollen throat and then steadily mounting temperature. Death comes in convulsions in about fourteen days, sometimes less. If you've got a heart, let us land. Help us!"

The group on the operations platform looked out at the defiled cradle. The medic was young but



old enough to know hopelessness. The Spaceway Control Police Chief, Conway, looked uncertainly at the ship. Conway knew nothing about medicine but he knew what had happened when the *Vestal* from Galaxy 159 had brought the red death here.

"What they got?" asked Conway. "Red death?"

"I don't know. Not that." And the medic asked other things of the ship.

"You must have some idea," said Conway.

"I don't know," said the medic. He turned to a phone and called his superiors and when he came back he was haggard.

A wonian had come to the ship

speaker now. She was pleading between broken sobs. They were trying everything they could out there in that ship. The medic tried to imagine what it was like with those closed ports. No doctor. The ball-rooms and salons turned over to dying men, women and children. The few live ones cringing in far places, hoping. Brave ones waiting on sick people. Some officer with his first command which would be his last. They had a kid at the ship speaker now.

Conway asked them for verbal messages and for an hour and a half the recorder took them. Now and then the speaker on the ship would change.

Mulgrave, president of Spaceways Intergalactic, Inc., owner of the *Star of Space* came and looked on.

At 10:72 sidereal galaxy time, Conway took the dispatcher's mike and ordered the ship away.

There were protests. Conway did not answer or repeat his order. Slowly the protests, the pleas vanished. Sullenness marked the ship then. For a long while nothing stirred. But at 11:24 a converter began to whine. At 11:63 the tubes gave a warning blast. At 11:67 the *Star of Space* lifted from her cradle, hovered and then slowly rose spacewards, doomed.

Ole Doc Methuselah arrived on Earth at 19:95 five days after. He arrived and Earth knew it. Ole Doc was mad. Ole Doc was so mad that he by-passed quarantine and control and landed square before the hangar, gouging big chunks of dirt up with the *Morgue's* landing blast.

A dispatcher came racing on a scooter to know what and why and he had his mouth open to become a very mad dispatcher when he saw the crossed ray rods. They were on the nose of the golden ship and they meant something. The same insignia was on the gorget at Ole Doc's throat. The ray rods of pharmacy. The ray rods of the Universal Medical Society which, above all others, ruled the universe of medicine, said what it pleased, did what it pleased when it pleased

and if it pleased. It owed allegiance to no government because it had been born to take the deadly secrets of medicine out of the hands of governments. The dispatcher shut his mouth.

Hippocrates leaped down, making a minor earthquake, although he was only a meter tall, and the dispatcher, at the sight of this four-armed antennaeed nightmare, quickly yanked the scooter out of the way.

Not even glaring, Hippocrates went to the cab line, grabbed a bumper and pulled. He intended to coax the driver into entering the forbidden field of the ramp but the only result was the loud breaking off of the bumper.

There was an argument, but it wasn't very long. Three minutes later a cowed driver had the can beside the *Morgue*.

Ole Doc swung down. He looked about twenty-five even if he was nine hundred and six, that being the medical privilege and secret of any one of the seven hundred society members, and when the sun struck his gold cloak and flashed from his boots, the dispatcher, again about to protest the actions of this ship, hurriedly drew back. He was looking at a Soldier of Light and it not only awed him, it paralyzed him. He would tell his friends and children about this for the next fifty years.

Ole Doc said: "Spaceway Control Building!"

The driver gave a terrified glance

at Hippocrates and shot the cab half again past its governor.

Ole Doc got down and went in so fast his cape stood out straight. He found Conway on the ninety-eighth floor in a magnificent office full of communications equipment and space charts.

Conway was bovine and leaden. He did not have fast reactions. He was a cop. He saw Ole Doc, thought of revolution, grabbed a button to bawl out a receptionist for not announcing and then stared straight into two very angry blue eyes and found that his hand had been swatted hard away from that buzzer.

"You listen to me!" cried Ole Doc. "You imbecile! You . . . you— Good Catfish! You haven't the discernment of a two-year-old kid! You . . . you flatfoot! Do you know what you've done? Do you know what ought to happen to you? Do you know where you'll wind up when I'm through with this? If you—"

Conway's bullish ire had risen and was about to detonate. He leaped up to have room for his rage and then, just as he was beginning to level a finger he saw the ray rods on the gold gorget.

"You . . . you're the U.M.S.," said Conway, idiotically holding the pose which meant rage but stammering like a schoolkid. Abruptly he collapsed into his chair. Weakly and with great attention he listened to the detailed faults of police and control systems in general, Conway

in particular and Conway's children and parents and grandparents. Conway learned some pretty terrible things about himself, including his personal appearance and the slightly sub-quality of his wits. Conway would probably go around being an illegitimate imbecile for days afterwards.

" . . . and," said Ole Doc, "if you don't locate that ship in twenty-four hours I'll yellow ticket this whole system. I'll yellow ticket Mars and Jupiter. I'll yellow ticket the whole condemned galaxy! You won't move a ship. You won't move a cruiser or a battleship or a tramp! You won't even move a lifeboat for more years than I've got patience. And," he concluded illogically, "I've got plenty of that!"

"What . . . what—?" begged Conway, the mighty Conway.

"Find me the *Star of Space*. Find that ship so whoever is on her can be saved. Find her before she lands and infects an entire planet, a system and a galaxy. Find her before you kill off millions, billions, quadrillions—" Ole Doc sat down and wiped his face. Hippocrates let go of the burly police receptionist with a warning wave of a finger and came in.

"You get excited," said Hippocrates. "Very bad. Take this!"

Ole Doc reached for the pill and then, seeing it completely, struck it aside and leaped up to face the wilted Conway.

"Have the Grand Council in here in ten minutes. I don't care if they're in China or digging clams at the North Pole. Have them in here or have trouble!" Ole Doc stamped out, found a seat in a garden looking over New Chicago, and composed himself as well as he could to wait. But his eyes kept straying to the blue heavens and he kept pounding a palm with a fist and swearing sharply.

Hippocrates came back in nine minutes. "Grand Council ruling Earth assembled now. You speak. But don't you get so excited. Five days to your next treatment. Very bad."

Ole Doc went in. His metal boot soles chewed bits out of the rug.

Eighteen men sat in that room, eighteen important men whose names meant law on documents, whose whims decided the policies of nations and whose intercession, arbitration or command ruled utterly the two and one half billion people of Earth. The Army officers were imposingly medaled. The Marine commander was grim. The Navy operations chief was hard, staunch, important. The civilians might have appeared to be the most powerful men there, they were so quiet and dignified. But it was actually the naval officer who ranked them all. He commanded, by planetary seniority and the right of Earth's conquests, the combined space navies of the galaxy whenever "the greater good of the

majority of the systems" was threatened.

They were grave and quiet when Ole Doc entered. They blinked a bit uncertainly when he threw his helmet down on Conway's desk. And when he spoke, they came very much to life.

"You," said Ole Doc, "are a pack of fools!"

There came an instant protest against this indignity. Loudest was that of Galactic Admiral Garth. He was a black-jowled, cigar-smoking man of six feet five, a powerful if not brilliant fighter, and he objected to being called a fool.

"You have let hell loose through the systems!" cried Ole Doc above their voices. "You've sent a cargo of death away where it can infect trillions of beings! That may be dramatic but by all that's holy, it's the truth!"

"Hold on there!" said Admiral Garth, heard because he could shake ports loose with his voice. "No confounded pill roller can come in here and talk to me like that!"

It stopped the babbling. Most of the people there were frightened for a moment. Those who had been merchants knew the yellow tickets. Those who only nominally governed saw whole nations cut off. The Army saw its strength cut to nothing because it could not be shipped and the Navy in the person of Galactic Admiral Garth saw somebody trying to stop his operations of fleets and he alone stayed mad.

"The *Star of Space* was sent away from here," said Ole Doc, spitting every word, "without medical assistance or supplies. She was rotten with disease but she got no cordon, no quarantine. She got dismissal! She went out into space low on supplies and fuel, riddled with disease, hating you and all humanity.

"Further, even though you were in communication with that ship, you did not find out the details, the exact, priceless details of that disease. You did not discover from whence she thought she received the disease or establish which passenger or crewman from what part of the Universe first grew ill. And you failed, utterly failed to find out where she intended to go!"

"That's why you are fools! You should have provided her with an escort at least! But no! You, the men who supposedly monopolize all the wits on Earth, the Earth which rules the galaxy, you let the *Star of Space* go away from here to murder — yes, murder! — possibly millions and millions of human beings. Perhaps billions. Perhaps trillions! I cannot exaggerate the folly of your action. Completely beyond the base-hearted wickedness which refused that ship the help she needed, you will be evil and sinful in the eyes of all men.

"I am publishing this matter to space. The Universal Medical Society can cure anything but stupidity, and where they find that,

in government, they must leave it alone!"

He sat down suddenly on the edge of the desk and glowered at them.

Hippocrates in the doorway was wondering whether or not he had put too much adrenalin into Ole Doc the last rejuvenation treatment and had about concluded that this was the answer.

Galactic Admiral Garth clamped an angry blue jaw on a frayed cigar. Pill roller, his attitude said. He'd never needed a doctor in his life and when he did he'd take a naval surgeon. Disease, bah! Every one knew that disease warfare had almost ruined mankind. The stuff was deadly. It said so in the texts. Therefore, a diseased ship should be launched as far away from humanity as possible and left to rot. It was good sense. Nobody could fight a disease when science could make new, incurable ones at every rumor of war. It had said so in the texts for a long time, for several hundred years in fact. That made it true.

"I won't co-operate," said Garth flatly. Nobody would catch him risking any of his valuable equipment.

"Admiral," said Lionel MacBeth, Council President, "I think it has been foolish of us. We sent the vessel away in a senseless panic amongst ourselves, trying to save this system without regard to others. The best we can do is—"

"It was done without my advice,"

said Garth, "but I'd do it myself if it was to be done again. The red death got away from three army doctors"—and he glowered at the Army—"who were trying to be humane about a camp full of it. I've investigated. The *Star of Space* could get nowhere. She's branded. She had very little fuel after a run from Spica—"

"She had five hundred light-years of fuel left!" said Ole Doc.

Garth bristled. This was too much from a pill roller. "What do you know about fuel!"

Hippocrates said: "You keep quiet!" and looked mad. Fuel indeed. Didn't he know whole volumes about fuel and engines? Whole libraries? And didn't his brain belong to Ole Doc? Of course his master knew about fuels!

Ole Doc said: "I ion-beamed New Earth of Spica." He pulled out his message log. "The *Star of Space* was trying out delphi particles. She took her original weight in them. She'd have an excess of five hundred light-years above her normal reserve. She could go anywhere this side of the hub. And when she gets where she is going, she is going to try to hide her plight. Why hasn't a general galactic alarm gone out?"

This was news to the Council. The *Star of Space* should have been completely out of fuel. Two or three nervous coughs sounded and here and there beads of perspiration began to grow.

Garth was silent. He was thinking.

"You'll have to act!" said Ole Doc. "I demand you throw out a net to intercept her, that you alert all navies to comb space, that you alarm any place she might try to land and that, in conclusion, you hold her at bay until 1 or another U.M.S. soldier can get there and take charge."

Seventeen heads nodded quick assent and then all attention went to Garth. Control and communication were naval functions.

Garth took out a cigar. He inspected it. He threw the frayed one away and replaced it with the fresh one. He bit the end, spat, tilted the cheroot up and looked contemptuously at Ole Doc.

"The warning will be heeded and you probably deserve some thanks for calling this to my attention. It is now in naval hands. With the permission of the Council I shall give my orders."

They gave it quickly enough.

Garth rose, shrugged into a space-coat and started to leave.

"May I ask," said Ole Doc, "just what orders you are going to give?"

"All space navies will be ordered to an emergency standing. Patrols will search their sectors. All navy bases will be alerted. And wherever found or whenever seen, the *Star of Space* is to be blown out of existence with some well placed shots. Good day."

The door closed behind him.

Ole Doc got up slowly.

"Yop abide by this?" he demanded of the Council.

They were uncomfortable.

"You do not see that if this ship is disintegrated we will have lost all possible chance of locating the source, type, course and treatment of that plague?"

They saw that but they were still uncomfortable.

"You," said Ole Doc, "are a pack of fools!" And when he had slammed the door behind him and strode off down the hall, Hippocrates was positive now about that adrenalin. Ole Doc was mad!

The first contact came when the *Morgue* was off the Carmack System and was announced as being within the Smith Empire on a planet called Skinner's Folly.

Ole Doc had guessed five years wrong and he muttered about it as the *Morgue* skimmed along under gyro control.

"We'll never make it," said Ole Doc. "That confounded System Police will get there and wreck everything. I know the Smith Empire!"

Hippocrates served soup in the lovely salon. The murals had been very specially constructed by an Old Seattle artist named Boyd who had been extremely grateful for having his life saved one afternoon when Ole Doc walked by a Venusian grog shop. The murals showed a tree of life growing all around the four walls of the room depicting the evolution of man and there were

many trillionaires and kings who would have paid a planet's ransom for a duplicate. Nobody but a Soldier of Light could have kept Boyd sober that long, however.

"Monkey stage," said Ole Doc, glaring at a gibbon who was gibbering in a lifelike manner, three-dimensional and moving, it seemed, in a tree. "Few of them ever get beyond the monkey stage. Give 'em fleas to pick and they're convinced they're solving all the problems of the world."

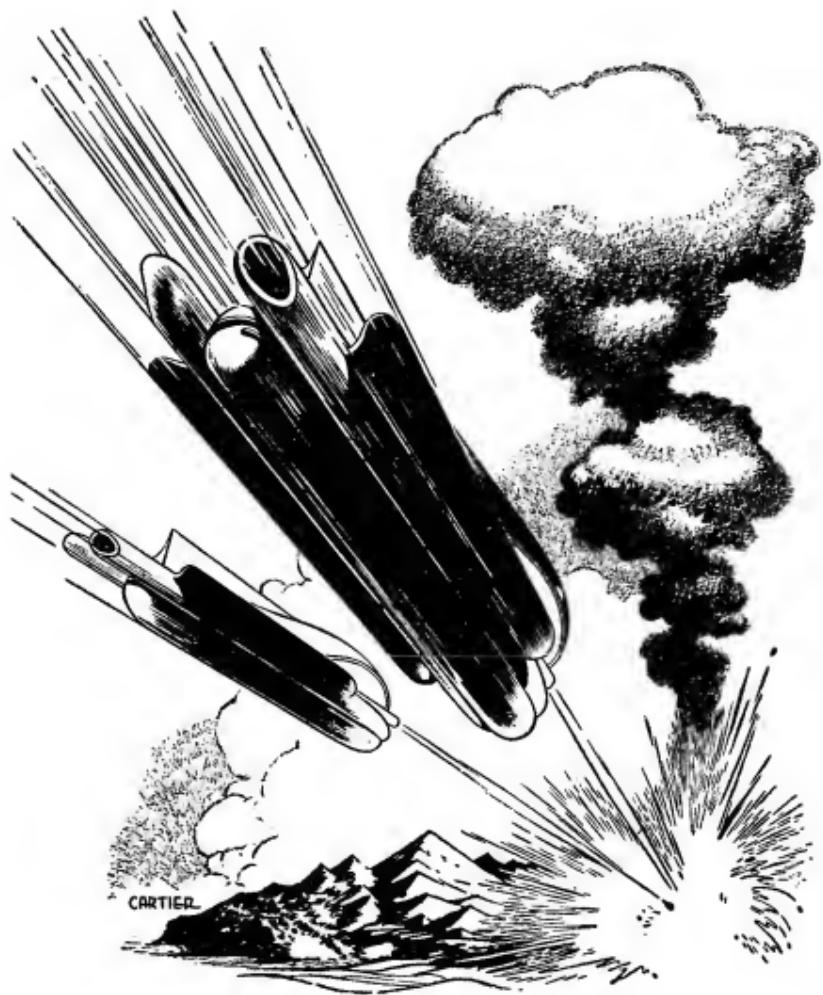
"Too much adrenalin. This afternoon when I fix," said Hippocrates, testing the coffee for temperature before he served it, "I cut down adrenalin."

"You'll cut down nothing, you gypsum freak! I feel fine. I haven't felt this mad in a hundred years. It does a man good to feel good and mad at something once in a while. It's therapy, that's what it is."

"I cut down adrenalin," said Hippocrates. "You got bad habits. You fall in love with women and sometimes you get mad. You drink, too," he added, spitefully setting out the muscate.

"I'll fall in love and I'll get drunk—"

"Love is the ambition of the failed man," primly quoted Hippocrates. "There is nothing," he continued, phonograph-record-wise, "so nauseous under all the suns and stars as a gusty-sighing lover, painted like a clown, exchanging spittle with a predatory female



under the delusion that he is most nobly discharging the highest injunctions of a divine—”

“You heathen!” said Ole Doc. “That gibbon has more sense.”

“He can’t make chicken soup,” wisely countered Hippocrates. “That is enough wine. At four-fifteen you be ready for treatment. Not so much adrenalin.”

Ole Doc rose and looked at the telltale instruments in the cabin bulkhead. He wrote a few figures on his cuff which told him that they would be landing at Skinner’s Folly by six. He went forward and tried to connect with an ion beam which would permit him to communicate with the Smith Empire. The Smith Dynasty, however, had been a very economical one and kept few beams going, depending more upon its staff of inventors than upon what was already practical and in use elsewhere.

At four-fifteen he suffered himself to be stripped and placed before a battery of ray rods, impatiently submitting to the critical ministrations of his slave. From some uncalculable system not yet discovered, Hippocrates was about as much affected by these powerful rays as a piece of lead.

The little slave found a tiny scar and that had to be fixed. He saw an off-color hair and the whole follicle system had to be treated. He fussed and clucked over a metabolism meter until he had what he thought was just right and then he shut off the rays.

“You skimped the adrenalin!” said Ole Doc, and before Hippocrates could interfere, he shot on the rheostat which blazed out with adrenal catalyst and flashed it off again. Self-righteously, he began to haul on his clothes.

Hippocrates began to quote long sections of “The Anatomy And The Gland” in a defeated tone of voice.

“Get back there and get to work!” said Ole Doc.

Hippocrates went. But he didn’t go to work. He took down a tome from the library and read a long chapter on “The Reduction Of Adrenal Secretion,” paying particular attention to the section, “Foods Which Inhibit Adrenal Fluid.” He read the lists, thus memorizing them at a glance, and made note of what to add to his stores when they reached Skinner’s Folly.

But they did not arrive in time. When Ole Doc came to Garcavielle, the capital city of the planet, the System Police had been there about six hours before.

From a cocky young reporter who was almost humble talking to a Soldier of Light, Ole Doc learned that the System Police, acting under advices from the Emperor Smith III, had undertaken and accomplished an unsavory mission.

At the bleak little town of Placer, the *Star of Space* had put in, landing at the Tri-System emergency field. The once great liner had made no pretense of its state but had appealed to the mayor of Placer.

There was no quarantine there since no intra-galaxy traffic ever dignified the place. But the mayor had known his dangers and he had immediately ordered the liner on.

The speakers of the great ship were not functioning and a communication had been wrapped around the handle of a wrench and thrown out of the vessel. This the mayor had read. His pity had been greatly aroused and he had communicated hurriedly with Emperor Smith III without permitting the remaining people or the sick to disembark.

Smith had answered abruptly and to the point. He had advices from the Galactic Admiral of this eventuality.

It had taken two days for a runner to come from Placer to the outside. And it had taken two days to get back: due to the fifty-thousand-foot peaks around the village, no atmosphere craft cared to brave the currents. A System Police spacecraft had gone in and for four days had examined the situation, carefully keeping a cordon around the *Star of Space*.

Suddenly the mayor of Placer had come down with spots in his mouth and his temperature had begun to rise.

The mayor had talked to many people in the village. He had talked to the System Police ship officers.

The *Star of Space* had listened to the System Police band and had the decision of Emperor Smith when it was given. The liner, with its cargo

of misery and death, had immediately taken off with destination unknown.

Two naval vessels had come in before the System Police craft could leave.

Twenty-inch rocket rifles had bored into the village of Placer. For five minutes the naval vessels had scorched the place.

When they left a thousand people were dead, the once-pleasant and rich valley a charred wreck. The passes were sealed through the peaks and a plague cross was painted on a dozen square miles from the air.

That was the end of Placer.

Ole Doc stood on the plain before the peaks and watched the rising smoke beyond. He had been late because he had not been promptly informed.

A thousand guiltless human beings had died.

Plague still lived in this galaxy.

It was no use to rail at Garth or excommunicate Emperor Smith.

Ole Doc went back to the *Morgue* and began anew the anxious search. Next time he had to be in at the end.

A lot depended upon it.

The *Morgue* cometed along at idling speed, automatically avoiding debris pockets, skipping over a dark mass here and by-passing a dead star there. Ole Doc had calculated, on the basis of information received from the Spica system, which included a list of passengers with countries—at fourteen dollars a

word high space rates priority—that he had a sixty percent chance of being somewhere near the next landing place of the *Star of Space*.

He had pounded the key ceaselessly in an effort to drum up the ship herself but either he was on a course diverging faster than he could contact ion beams or the *Star of Space* had no communications operator left alive. Ole Doc gave it up, not because a naval flagship had tried to shut him off and bawl him out, but because he had suddenly shifted his plans.

He had to find that ship. He had to find her or the U.M.S. would be slaving on this disease for the next thousand years, for such are the depths of space that unknown systems and backwash towns can harbor something for centuries without notifying anyone else. The method of this notification would be grim.

Ever since the first adoption of the standard military and naval policy of "sterilization" the U.M.S. had had its grief. When men found they could take a herd of innocent bacteria, treat it with mutatrons and achieve effectively horrible and cure-resistant diseases, the military had had no patience with sick people.

The specific incident which began the practice was the operation against Holloway by the combined Grand Armies of the Twin Galaxies wherein sown disease germs by the attackers had been re-mutated by the defenders to nullify the vaccine in the troops. The Grand Armies, as

first offenders, had gone unsuspectingly into the Holloway Galaxy to be instantly chopped down by the millions by what they comfortably supposed was harmless to them. With an entire galaxy in quarantine, with millions of troops dead—to say nothing of two billion civilians, the Grand Armies had never been able to recover and reassemble for transhipment to their own realms but had been relegated to the quarantine space, a hundred percent casualty insofar as their own governments were concerned.

This had soured the military on disease warfare and not even the most enthusiastic jingoist would ever propose loosing that member of the Apocalypse, PLAGUE, against anybody, no matter the heinous character of the trumped up offenses.

Now and then some would-be revolutionist would clatter his test tubes and whip up a virus which no one could cure and so disease warfare came to have a dark character and now smelled to the military nose like an anarchy bomb.

Hence, sterilization. When you had a new disease you probably had a revolt brewing. There was only one thing the military mind could evolve. This solution consisted of shooting every human being or otherwise who was sick with non-standard symptoms; and should a community become stricken with a mysterious malady, it was better the community die than a planet.

The Universal Medical Society,

operating without charter from anyone, safeguarding the secrets of medicine against destruction or abuse, had been instrumental in solving the original military prolixity for disease warfare. Indeed, this type of fighting was one of the original reasons why the U.M.S. was originated and while there were countless other types of medicines which could be politically used or abused, the germ and the virus still ranked high with the out-of-bounds offenses.

Center had contacted Ole Doc some days since, offering to throw a blanket ticket on the Earth Galaxy and stop Garth. But in that this would mean that some millions of isolated humans would probably starve, that business would be ruined and so create a panic, and that the rumor, traveling far and fast would probably demoralize a dozen galaxies or overthrow ten thousand governments, Ole Doc dot-dashed back that he would play out the hand. That was brash. Hippocrates said so. It meant Ole Doc couldn't lose now without losing face with his own fellows, the only beings in the entire Universe with whom he could relax.

And so he let the *Morgue* idle and kept all her speakers tuned to the jingle-jangle of space police and naval bands. That they were all in code did not bother him. A junior officer, back at Skinner's Folly, had gained a healed stomach and had lost, unbeknownst to him, the search code via truth drug. If the junior

officer would not be able to lie for two or three months, Ole Doc had the search code memorized.

"Styphon Six . . . to . . . over . . . yawk scowl scree Hydrocan . . . roger . . . under over out—" mimicked Hippocrates in disgust at the clamor which filled this usually peaceful old hospital ship. "To Command Nine . . . scree . . . Command Nine . . . swowwww—Foolish people. Why they do all that, master?"

Ole Doc looked up from a manual of disease diagnosis. "It's bad enough to listen to those things without you parroting them."

Hippocrates stood in the door self-righteously kneading bread dough with three hands and drinking some spiced ink with the fourth. "Foolish. They should say what they mean. Then maybe somebody get something done. Go here, go there. Squadron, Flight, Fleet attention and boarders adrift! Navy get so confused no wonder we got to do their work."

"Now, now," said Ole Doc.

"Well, it may not confuse enemy," said Hippocrates, "but it sure ruin operation of own fleet." He finished the ink, popped the bread under a baking light and came back wiping his hands on an apron. "Good thing no girl you know on *Star of Space*. Then we really get in trouble."

"You leave my private business alone."

"You so full of adrenalin you maybe catch chivalry."

"That's not a disease."

"It disease with you," said Hippocrates, out of long suffering. "You stop reading now. Bad for eyes. You tell me page number and book and I quote."

He got the book all right, but he had to duck it, it came so hard. Ole Doc went back to the chart-room, which lay beyond the main operating room and its myriad bottles, tubes, instruments and bins. He pin-pointed out the courses of the main units of the search fleets and wiped off a large section of the galaxy. He threw a couple of switches on the course comptometer and several thousand cogs, arms and gears made a small whirr as the ship shifted direction and dip.

Somewhere in this sphere of thinly mattered space was the *Star of Space*, or else like a drop of water under Vega's blast, she had utterly evaporated away.

Ole Doc was nervous lest he miss. Who knew how many millions of human beings might be infected by this before he was done. If only he had an exact description of symptoms!

And he sat in the "office" of the *Morgue*, endlessly speculating until:

"Scout Force Eighty-six to Command. Scout Force Eighty-six to Command. Clear Channel. Operational Priority. Clear Channel. Scout Force Eighty-six to Command. Banzo! Over."

Ole Doc whipped upright and

grabbed his direction finders. He could get the distance in to that beam and know which way the command answer would travel. The nearest ion beam which was actively maintained was only fifteen seconds away. He had been traveling along it, parallel, after his last course change.

The speakers were dead except for faint crackling. The moment was tense with nothingness.

And then: "Command to Eighty-six. Command to Eighty-six. Revolve and Able. Over."

"Eighty-six to Command. Eighty-six to Command. Arcton P Lateral. Over."

"Command to Eighty-six. Command to Eighty-six. Operating Zyclo X23 Y47 Z189076. Obit Banzo if Jet. Order Box Arcton J¹ Lateral. AHDZA, ZED DOG FOX A B'L E. WILLIAM GEORGE QUEEN BAKER. QUEEN QUEEN CAST FOX. Over."

There was a pause. Then. "Eighty-six to Command. Eighty-six to Command. Wilco and out."

The series of orders which began to blaze and sputter through the speakers were assembly and destination commands with the High Fleet manifesto for suspension of civil liberties on every one of the five planets of Sirius. With this the forward surge of a third of a million naval craft could be felt. Banzo was run to cover. The hunters were coming up to the hounds.

Ole Doc made a rapid scan of his charts.

Banzo, code for the *Star of Space* had been located on the ground at Green Rivers, third habitable planet of Sirius, Arcton P Lateral being the one column removal in the Star Pilot lists for Sirius. Eighty-six had orders from Garth to blow the *Star of Space* out of the heavens if it attempted to take-off and to knock apart any merchantman that tried to go to or from Green Rivers. The civil authority of the Sirius System, that being a satellite of the Earth government, had been suspended and Marines were probably right now swarming down upon Manford, the capital on the planet Wales, to pick up the reins of state.

The comptometer told Ole Doc he could be at the rendezvous mentioned within two hours either way of Garth's arrival for they were now at two points of a triangle, not near but equidistant from Sirius. It all depended on the *Morgue* and she shortly began to put light leagues behind her in a way which made the galley a shambles and did nothing to improve the temper of Hippocrates.

He staggered up to control and said, peeviously: "Even if you find, you ruined the bread."

"Get out of here," said Ole Doc. "I've got several thousand fast cruisers to beat and by all that's holy, they're going to be beaten!"

From the way they skimmed the edges of clusters and plowed through systems and dodged comets for the next eight days, even Hip-

pocrates gathered that this was important enough to put on some effort. He took to going back to the fuel chambers and helping the auto-feeders. That would have been a short and unmerry death to any human but the deadly rays seemed to like him. Hippocrates liked them. They were part and parcel of machinery and machinery, to him, was lovable. After all, wasn't it only human?

So Ole Doc rode the controls with fire in his sleepless eyes, one ear glued to the channels which would tell him if anything serious would happen before he got there and one ear to the ticking meters which said that if he kept stretching the *Morgue* out like this, she wouldn't have a sound seam in her whole, ancient hull.

It worried him because he was outrunning the bulk of the signals he would receive in case something went wrong. After you go just so fast in space, incoming stuff sounds like a Japanese record of a woman in hysterics played treble time, even when you are looping it off an ion beam.

On the seventh day they went through a space maelstrom which almost chipped Hippocrates to pieces. This phenomenon was no more than an unleashed hurricane of magnetic energies, unplotted and unpredicted. Ole Doc kept the throttle all the way down and they came through.

All during the eighth day they wore out spare tubes trying to brake.

About three-thirteen s.g.t., all the port tubes went out at once and they had a wild, tumbling hour in which they passed Sirius as if it had been stabbed with a spur and then another two hours of limping while Hippocrates and Ole Doc clung to the outside plates and unjammed the fried rinds of metal which prevented reinstallation of the new linings.

It was after the succeeding two

before they were at the rendezvous point and it was a very spent crew of two which came up to find fully half of the navies of the galaxy assembled in an array which would not be seen for many another day.

An hundred thousand ships, more or less, were grip to grip in squadrons, suspended majestically in scattered but orderly formations all about the space of Green Rivers.



An eye at a spaceport could not grasp their infinity. The light of the huge dumbbell planet blazed from their sides and made them so many jewels, for this was peace and metal was shined. Blinkers were flashing and lifeboat and gig lights were moving about until it looked, in the far distance, like a whole new galaxy had been born.

Orders were being rushed on a dozen admiralty bands. Barges cruised to conferences. Fleet train vessels moved amongst the horde with supplies and new air.

It was an imposing sight. Here lay, side by side, navies which had within the last century been searing one another out of the darkness. Here were reunions of peoples who had long since forgotten any connection with Mother Earth.

It was a blinding, majestic array.

Ole Doc was indifferent to its majesty. He wanted the flagship of Garth.

Patrol craft, as the *Morgue* cruised by the drifting lines, came out to blare a surly warning and then sheered off from the gold color of the hull without even trying to see the ray rods. Ole Doc, by naval etiquette, was entitled to priority in any anchorage. More than one spaceman of the navy heaved a gusty and hopeful sigh of relief at the sight of that hull.

But the *Morgue* had proved a better vessel than the *Tangier-Mairlicon* which had Garth's flag. In that the *Tangier-Mairlicon* was about one tenth the age of the

Morgue, this was amazing. But the mighty, thousand-man vessel was not there. The radar did not catch her identification signal and Ole Doc's flaring eye saw no blazing blue star of authority present.

He gave the controls to Hippocrates who, though this was nervous going, navy people knowing or caring no more about the rules of the road than they did, was well qualified to take them in to a safe position.

Ole Doc was satisfied that the *Star of Space* had not left Green Rivers, just as he was certain that he would be boarded and stopped if he tried to land on that planet.

He gave the sphere near them a pitying glance before he lay down in his cabin. It looked like a very pleasant planet. There would be no help for it whatever if the *Star of Space* had spread its death across its face.

Tuning up a speaker on the command channel reserved for Garth in all this babble, Ole Doc stretched out for a good sleep. The last he heard was a junior officer, officer of the deck on some cruiser trying to make headway over the control visagraph with a very snide Hippocrates.

Garth arrived full of purpose and blowing cigar smoke like a steam turbine. The voice which awoke Ole Doc was so thick with authority that it must have carried through a vacuum by itself without benefit of radio waves.

"Admirals of all Fleets, attend on

the flag at sixteen-thirty hours." There was a click and that was all. Galactic Admiral Garth had spoken.

Ole Doc dressed with leisure, having bathed in hot water—a practice on which Hippocrates frowned since it would have dissolved the little slave in a splash had he neglected to grease himself up first. Ole Doc pulled out a new cape, a presentation cape from Omphides on the event of his having solved a small problem for them in that system. It had a great display of jagged flashes done across it which, besides furnishing the symbol of ray rods rampant in solid gold, had actual ray reservoirs in the design which purified the air around and about. His old helmet had numerous scratches across it but that couldn't be helped. His boots were a bit scuffed despite all Hippocrates could do for them. When he thought of what those admirals would be wearing—suddenly he put the presentation cape back and got out his old one. In a very few minutes he entered his lifeboat and went across to the *Tangier-Mairlicon*, leaving the *Morgue* tethered to vacuum.

The officer of the deck, a commander, had been having his eyes dazzled enough that day, what with the flood of gold lace coming through the side, and his marines and sideboys were nearly spent with standing to. The chief warrant bos'n saw the flashing gold but he could not spot the uniform. The ood saw the strange being coming

up with this new "officer" and hurriedly grabbed a book of traditions, customs and courtesy throughout the galaxies.

Hippocrates had been there to run the lifeboat back but when he saw all these crossbelts and naked swords he became frightened. "I wait," he said.

"Return to the ship," said Ole Doc.

"You watch the adrenalin!" said Hippocrates, not daring to disobey.

The chief warrant bos'n took a breath and hoped he would pipe whatever was proper on his whistle and then, breath still sucked in, stared and blew not at all. It was the first time in his life he had ever seen a Soldier of Light and for the first time that day he was impressed.

"Belay the honors," said Ole Doc to the now stammering commander. "I want to attend this conference."

The commander gave him a Marine for a guide and then, on second thought, gave him two more. When the group had gone on, the ood turned wonderingly back to his book of courtesy.

"It won't be there, commander," said the chief warrant bos'n, for he had known the commander as a midshipman and ever afterward treated him with a hint of it the way old spacemen will. "That's a Soldier of Light."

"It isn't here," said the commander.

"Neither," said the old chief warrant, "is God."

Ole Doc entered the admiral's quarters just as Garth's fist was coming down to smite a point into his palm. The fist halted, Garth stared. Twenty-six admirals stared.

"I see," said Ole Doc, ignoring the chair his guide had stiffly pulled up for him, "that it takes a very large weight of naval metal to sterilize one poor liner today."

They regarded him in confused silence, recognizing the gold gorget, startled by the obvious youth of this man who stood before them, failing to recognize the arts which kept him young, failing also to grasp just why they were confused. But admirals or not they had been young once. They had heard the legends and tales. Some of them felt like guilty children.

"Down there on Green Rivers," said Ole Doc, "is a fragment of a ship. She is in trouble. Any still alive aboard her have a right to life."

Garth caught his breath. "How did you know," he roared, "where to find this fleet?" He could get to the roots of things, Garth. That was why he was a galactic admiral and the rest here his juniors even if his seniors in age.

"I cracked your code," said Ole Doc. "It was not a very hard code to crack, I might caution you. But then one does not need much of a code to fool one battered liner with a cargo of sick and dead."

Garth's blue jowl trembled. "Our medical men have already investigated. The disease cannot be

cured. It is unknown. Nothing like it has ever been known. Do you know what has happened down there?"

Ole Doc didn't.

"Two men escaped from your precious liner five minutes after it landed. This morning there were fifty cases of that disease near Piedmont! There were nine cases in Hammerford and twelve in Hartford! The planet lines have not been interrupted. Not even a road has been blocked. The planet is rotten with it. That means one thing and one thing only. I am here to give orders. This matter is well in hand!"

Ole Doc looked at Garth and suddenly understood why the man was fighting him. Authority. Garth had battled his way to the height of all naval ambition. Since the age-old abolition of seniority leadership, the dynamic people got quickly to the top. And although this was hard on juniors, it was wonderful for efficiency. It's only flaw was power-hunger, but nothing in all the Universe would work without that.

"What is the population of Green Rivers?" asked Ole Doc with a quiet born of his understanding.

"Nine million, the whole planet. Thirty cities and two hundred odd towns. Are you going to weigh that against the good of all space? No, I think not. I am in charge here. I will not be bullied by a pill roller. According to regulations, this system must be sterilized and sterilize we will!"

"By?" said Ole Doc.

"By scorching that planet. By leveling everything with rays that will last for ten years. Be sentimental if you will, surgeon, but there are fifty million men in these navies. Do you want them to catch this stuff and die, too?"

"Admiral," said Ole Doc, "I have no desire to see anyone die. That is my profession. That is why I am here. The *Star of Space* needs help. She is an Earth ship, manned by officers and people like yourselves. And she has women and children aboard."

"I'd have been saved all this if she'd been disintegrated at the start!" said Garth.

"Down there on this planet, Green Rivers, there are nine million human beings or breeds. They have homes and farms and children. They have churches and projects for celebrating the harvest. They have plans and hopes. And they've carved a wilderness into something of which they are proud. And you," he said to the assembled, "are going to destroy it all."

It made them uncomfortable. They would not look at his face.

"You've forgotten," said Garth, "what happened during the red death. I commanded a corvette under Van der Ruys. We were at Guyper in Galaxy 809 in '71. I saw what disease could do when it was not checked. Guyper is still a ruin and the stories I heard—"

"Are not half as bad as those which will be told of Green Rivers

if you sterilize it," concluded Ole Doc.

"We don't want sickness in our fleets," said Garth, "and that's final. I give the orders here. At nineteen hours we cleanse this system. We have no other choice. You yourself," he hurled at Ole Doc, "admit that you have no notion of what this may be."

"You must first let me go down there," said Ole Doc doggedly.

"And come back to reinfect? No!"

"One moment," said Ole Doc. "You have forgotten something."

Garth glared.

"I am not under your orders, admiral."

"Your ship is staying where it is," said Garth. "When you go back you will find a cruiser alongside."

"He'll not dare detain me," said Ole Doc.

Garth was dangerously angry. Authority was as precious as blood to him. "If you defy me—"

Ole Doc said: "Admiral, I am leaving." He shook out a handkerchief and delicately fanned the air before his face before he restored it. "We've got warm in here, haven't we?"

Ole Doc left, went by the speechless men on the deck and was taken in a gig back to the *Morgue*.

How very small the portable little hospital looked amid all this naval might, thought Ole Doc. The *Morgue* was tiny against the side of

the attending cruiser which, it must be admitted, was having a very hard time due to an incessant demand to shift bumpers from a little four-armed being on parade.

Ole Doc went through the lock and into the cruiser. He found the commanding officer very nervous with his duty.

"I say, sir," said the captain to Ole Doc, "you've a very devil aboard, you know. He's made us do everything but wrap ourselves in silk to keep from scratching his precious ship. We've been awfully decent about it—"

"I want permission to leave," said Ole Doc. "I ask it as a formality, because I am going to leave anyway."*

The captain was shocked. "But you can't! You absolutely can't! I've got orders to stay right where I am and to keep you hard alongside. The second you were sighted lying here, Admiral Garth sent me a positive injunction—" He fumbled on his mess table for it and found the radioscript.

"You would fire on a Soldier of Light?" said Ole Doc, dangerous.

"No, heavens no! But . . . well, sir, you haven't the power to pull us around and I'm afraid the grapplers are sealed."

Ole Doc looked calculatingly at the man. In Ole Doc's pocket was a hypo gun that would make this captain agree the stars were all pink with yellow circles. The second button of Ole Doc's cloak, if lighted, would fix said captain in his tracks.

A capsule in Ole Doc's kit released into one ventilator of the ship would immobilize the whole crew for hours.

But Ole Doc sighed. It was so flagrantly against the U.M.S. code to interfere with an official vessel in performance of its ordered duty. And if the young man disobeyed, it would be his finish in the navy. Ole Doc took a cup of coffee from a very deferential and grateful captain. A little later he went back to his ship.

At eighteen-thirty s.g.t., Ole Doc awoke from a short nap. He looked out of the port and saw the lovely green of the planet through its clouds. He frowned, looked at his watch and then went into the operating room.

He gargled and blew antiseptic jets into his nose and dusted himself off with a sweet smelling light which incidentally washed his face and hands. He puttered for a while with a new lancet Soldier Isaac had given him last Christmas and then made short passes with it in the air as though he was cutting somebody's jugular—not Garth's, of course.

Orders. Orders were inexorable soulless things which temporarily divorced a man from rationality and made him an extension of another brain. Orders. Born out of inorganic matter contained in some passionless book, they yet had more force than all the glib conversations of a thousand philosophers. Orders. They made men slaves. Garth was a slave. A slave to his own orders.

Ole Doc opened a text on electro-

deductive psychiatric diagnosis and turned to "paranoia." It was eighteen-fifty. If Garth was going to blast at nineteen—

The command speaker barked up. "Galactic Admiral Garth to U.M.S. *Morgue*. Galactic Admiral Garth to U.M.S. *Morgue*." It came over the commercial channel as well and was echoing up there in the control room.

Ole Doc went to his communications panel. He turned a switch and swung a dial. "*Morgue* to Garth. Over."

"*Morgue*. Urgent. The disease has reached the fleet. Something must be done. What can you do? Please do something! Anything!"

"Coming aboard," said Ole Doc and shut off his panel.

They almost mobbed him trying to get him aboard this time. They rushed him to the cabin. They saluted and bowed and pushed him in.

During the few hours which had elapsed, a considerable change had taken place in Garth.

The admiral was pale. Five admirals attended him and they were pale.

Garth was courageous.

"I suppose this means we are doomed," he said, trying to keep his hand away from his throat, which ached frighteningly. "The scout vessels which approached the *Star of Space* must have been infected in the air. Their captain reported to me here. He must have

been the carrier. I . . . I have infected the officers who were with me today. They, returning to their ships, have exposed their crews. My own medical officer"—and it was easy to tell how difficult this was for Garth to beg a favor—"has no idea of what this can be. You must do something. You have asked for a case so that you could study symptoms. You have that case, doctor."

Ole Doc sat on the edge of the desk and swung a boot. He shrugged. "When you deal with diseases which have not been studied over a full course of sickness, you can form no real judgment. I am sorry, admiral, but there is nothing much which can be done just now."

"They've got full courses on Green Rivers," said Garth.

"Ah, yes," said Ole Doc. "But I am, unfortunately, forbidden—"

Garth was steady and stern. How he hated asking this! How he despised this pill roller despite the present plight! "I will release you from that. If you care to risk the sickness, you are free to study it."

Ole Doc handed up an order blank from the desk and Garth wrote upon it.

"If it were not for the sake of my officers and men," said Garth. "I would not bother with this. I do not believe anything can be done. I act only on the recommendation of naval surgeons. Is that clear?"

"Orders again," murmured Ole Doc.

"What?" said Garth.

"In case of sickness, the medical

corps, I think, orders the line. Well, I'll see if I know anything. Good day."

They let him out and through the side. Back in his ship, Ole Doc presented the order to the cruiser captain and the *Morgue* was freed. Five minutes later, at the controls, Ole Doc sent the *Morgue* knifing through the cloud layers and across the verdant surface of the beautiful planet.

He found the shapely towers of Piedmont with no trouble and in a short while was settled down upon the red earth of the landing field.

Within five minutes the *Morgue* was likely to be crushed by the mob which pressed to it. There was anxiety and hysteria in the welcome. Women held up their children to see the ship and hitherto accounted brave men fought remorselessly to get close enough to it to beg succor. Officials and police struggled with the crowd, half to clear it, half to get near the ship themselves. An old woman in the foremost rank, when the area before the port had been cleared, knelt humbly and began to pray in thankfulness.

Ole Doc swung out, stood on the step and looked down on their heads. The babble which met him was almost a physical force. He waited for them to quiet and at last, by patience alone, won their silence.

"People," said Ole Doc, "I can promise you nothing. I will try. While I am here you will help by giving me space in which to walk and work"—for he had been in such

panic areas before—"so that I can help you. I cannot and will not treat an individual. When I have a solution, you will all benefit if that proves possible. Now go to your homes. Your radios will tell what is taking place."

They did not disperse but they gave him room to walk. He went across the field and down a tree-lined street under the directions of an army officer who informed him that the *Star of Space* was landed, partially disabled, at a flying field near the ball park.

Data was poured at him by people who fled along on either side and walked backwards a distance before him. Most of it was contradictory. But it was plain that in the last few hours a thousand cases had broken out across the face of Green Rivers.

It was a pleasant town upon a pleasant planet. The neat streets were flanked by wide gardens and trees and the heat of Sirius was comfortable. Ole Doc sighed as he realized how he stood between this homely work and a charred planet of debris.

A quack, selling a box of "fever cure" saw Ole Doc coming and ashamedly tried to stand before his sign and hide it. How the man expected to get away with any money he made was a mystery of psychology.

The *Star of Space* was a desolation. She had jammed into the ground on landing, fracturing her tubes. Bad navigation had dented

her with space dust. Her sealed ports were like sightless eyes in a skull.

Ole Doc stood for a while within twenty feet of her, gazing in pity. And then he cupped his hands. "Star of Space, ahoy."

A lock opened and a gaunt young man in a filthy uniform stood there. "A Soldier of Light," he said in a hushed voice.

A woman was crying on Ole Doc's left, holding a child cradled in her arms and when they saw her the crowd shrank from her for the child had closed eyes and was breathing with difficulty. But Ole Doc did not see her. He advanced on the *Star*.

The young man tried to say a welcome and could not. He dropped his face into his hands and began to sob soundlessly.

Ole Doc pushed on through. He was, after all, a mortal. Diseases respected no man, not even the U.M.S. It is valiant to go up against ray guns. It took more nerve to walk into that ship.

The stench was like a living wall. There were unburied dead in there. The salons and halls were stained and disarrayed, the furniture broken, the draperies torn down for other uses. A piano stood gleamingly polished amid a chaos of broken glass. And a young woman, dead, lay with her hair outspread across the fragments as though she wore diamonds in her locks.

The young man had followed and



Ole Doc turned in the salon. "Bring the other people here."

"They won't assemble."

"Bring them here."

Ole Doc sat down in a deep chair and took out a notebook. After a long while the people began to come, a few at a time, singly or in large groups. They looked at one another with fear on their faces. Not a few of them were mad.

A girl hurled herself across the salon and dropped to grasp at Ole Doc's knees. She was a beautiful girl, about twenty. But hunger and terror had written large upon her and her hands were shaking.

She cried out something over and over. But Ole Doc was looking at the people who were assembling there. Then he dropped his eyes

for he was ashamed to look at their misery longer.

He began as orderly as he could and gradually pieced together the tale.

The disease had begun nine days out, with one case, a man from Cobanne in the Holloway System. He had raved and muttered in delirium and when partly conscious had informed the ship's doctor that he had seen the same sickness in Cobanne, a backspace, ruined remnant of war. He was a young man, about twenty. Twenty-one days out he died, but it was the opinion of the doctor that death was due to a rheumatic heart which the patient had had prior to the disease.

This was news enough, to find a place where a rheumatic heart was considered incurable. And then Ole Doc recalled the disease warfare of the Holloway System and the resultant poverty and abandonment of what had once been rich.

The next case had broken out twelve days after departure and had terminated in death a week later. Ole Doc took down the details and made a scan of nearly forty cases to arrive at a course.

The disease had an incubation period of something up to ten days. Then for a period of one week, more or less, the temperature remained low. Spots came in the mouth—though these had also been noted earlier. The temperature then rose rapidly and often caused death in this period. If it did not, the throat was greatly swollen and spots

came out on the forehead and spread down over the body. Temperature then dropped to around ninety-nine for a day but rose suddenly to one hundred and five or more at which point the patient either died or, as had happened in two cases, began to recover. But death might follow any sudden temperature rise and generally did.

Ole Doc went back to a cabin where a currently stricken woman lay and took some phlegm. He processed it quickly and established the disease as a nonfilterable virus.

There were two hundred and twenty well officers, crew and passengers remaining on the *Star of Space*. They were without hope but their eyes followed Ole Doc whenever he moved across the salon going to patients in other parts of the ship.

The inspection took an hour and Ole Doc went then into the daylight and sat down on the grass under a tree while Hippocrates shooed people away. After a long time, it looked as if Ole Doc were asleep.

But he was not sleeping. No modern medical text contained any mention of such a disease. But that, of course, proved nothing. The U.M.S. texts were blank about it, that he knew. But it seemed, somehow, that he had heard or read something, somewhere about it.

The study of such diseases was not very modern after the vigorous campaigns for asepsis five hundred years ago. But still—Ole Doc

looked at a stream nearby and wondered if it had any fish in it. Hang it, this area looked like the Cumberland country back in his native Maryland, a long, long way and a long, long time from here. Maybe if he fished—but his dignity here, right now, would not permit that. These people expected him to do something. Like that old woman, when he was a brand new doctor up in the Cumberland Gap. Her child—

Ole Doc leaped to his feet. He grabbed the kit from Hippocrates and flung out the contents on the grass. After a short space of study he began to call for details and it was like a bucket brigade line the way Hippocrates was hustled back and forth by people between the *Morgue* and the *Star*.

He called for barrels. He called for wrapping paper. He played light on scraps of meat and he had a patient brought out from the ship and made him spit and spit again into a small cup.

The cup was treated and from the contents a drop was put in each barrel. And then the barrels were full of ingredients and being stirred under a light. And then another light, hitched to a thousand pounds of tubes and condensers, was lowered into each barrel and the mixtures left to stew.

It was crude but it was fast.

Ole Doc called for the young man—fourth officer of the *Star of Space*.

"I can catalyze the course of this

disease," said Ole Doc. "I want a guinea pig."

The young man took a reef in his nerve. He stood forward.

Ole Doc made him open his mouth and poured in a deadly dose. Then he played a new electrode over the fourth officer. Within five minutes the first symptom of the disease had appeared. In ten, the man's temperature was beginning to rise.

Ole Doc grabbed a needle full of the contents of the first barrel. He gave the fourth officer a nonpiercing shot. Five minutes later the temperature was down and the man was well!

Ole Doc tried his antitoxin on five people and tried to give them the disease. It would not settle in them. They were immune!

"I want," said Ole Doc, "volunteers to write these instructions down, let me check what they have written and rush gallons of both these medicines to every part of this planet. You, you're the space-radio superintendent aren't you? Take what I dictate here for warning to all systems and to provide them with the cure and prevention. Hippocrates, give me that mike."

Ole Doc said into the speaker, "U.M.S. to Garth. Prevention and cure established. *Star of Space* survivors will not be carriers. You may disperse your fleet. Your doctors will be furnished with information by the general dispatch."

He turned to a local doctor, a young man who, for some thirty-

five minutes, had been standing there with his mouth open. "You see the procedure, sir. I would advise you to get in and treat the patients in that poor ship. If you need my further help, particularly with those who have become insane, I shall be at hand. I think," he added, "that there are trout in that stream."

Hippocrates carried the equipment back, an elephant load of it, and restored it to its proper places in the *Morgue*. Ole Doc, when he had got free of people trying to kiss his hands, push money on him and lift and carry him in triumph, climbed into the *Morgue* and stretched out his feet under his desk. He made a series of interesting notes.

It is sometimes unwise to remove a disease entirely from the Universe. It is almost impossible to eradicate one completely from all quarters of the Universe, particularly as some are borne by animals unbeknownst to men.

The human being as a race carries a certain residual immunity to many violent diseases so that these are, in time, ineffective against a group with which they have associated but, reaching a new group, pass quickly to destructive lengths.

Diseases known to us commonly now would be fatal should we outgrow that immunity. In such a way are the penicillinlike panaceas destructive at long last.

I would advise—

A deferential footfall sounded at the office doorway. Ole Doc looked up, preoccupied, to find Galactic Admiral Garth.

"Doctor," said Garth uncomfortably, "are you busy just now? I can come back but—"

"No, no," said Ole Doc. "Come in and sit down. Have a drink?"

Garth shuffled his feet and sank gingerly into his chair. Plainly he was a victim of awe and he had a problem. "That was magnificent. I . . . I've been wrong about doctors, sir. I have been very wrong about the Universal Medical Society. I said some hard words—"

"No, no," said Ole Doc. "Come, have a drink."

"Well, the fact is," said Garth, "my doctors tell me that what my admirals and myself have . . . well . . . it doesn't fit the description. I don't mean your diagnosis is wrong—"

"Admiral," said Ole Doc, "I think I know what the trouble is." He reached into a desk drawer and pulled out a package which he gave to the admiral. "Take one every four hours. Drink lots of water. Tell your other men to do the same and keep to their quarters. Anybody else comes down, have your doctors give them this." And he wrote a quick prescription in a hand nobody but a pharmacist could read and gave it to Garth. Deciphered, it said "Aspirin."

"You're sure—" And Garth blew his nose.

"Of course I'm sure!" said Ole Doc. "Now how about—"

But Garth was uncomfortable around all this greatness and he

managed to get away, still giving his feeble thanks, still with awe in his eyes.

Suddenly Hippocrates appeared, an accusative gleam in his eyes, antennas waving with wrath. "What you give him? What you do with this out of place in the operating room?"

"Oh, by the way, Hippocrates," said Ole Doc, pulling out a handkerchief and banding it gingerly over. "Boil that when you wash. It's slightly septic."

"You did something! You gave somebody some disease! What you doing with—"

"Hippocrates, that bottle you keep stabbing at me is just common cold virus catalyzed to work in two or three hours. It's very weak. It wouldn't kill anyone. I merely put some on my handkerchief—"

Hippocrates suddenly stopped

and grinned. "Aha! The admiral had the sniffles. Well, serve him right for kill all those innocent people. But sometime you get in trouble. You wait." He started to march off and then, impelled by a recalled curiosity, came back.

"What was the matter with all those people?"

"Too well cared for by doctors," said Ole Doc.

"How?"

"Hit by a disease which they hadn't contacted for a long, long time—say five hundred years."

"What disease?" demanded Hippocrates. "Not one that you spread?"

"No, no, heaven forbid!" laughed Ole Doc. "It has a perfectly good name but it hasn't been around for so long that—"

"What name?"

"Common measles," said Ole Doc.

THE END

EXTRATERRESTRIAL BIOCHEMISTRY NOTE

At various times it has been suggested that life forms might evolve on other planets based on silicon or boron instead of carbon. Possible, but improbable; these elements, while capable of highly complex chemistry, can't approach carbon in that respect.

The article this month suggests a quite new possibility, one really found during the Manhattan Project's work. Fluorine can react with carbon compounds replacing either hydrogen or oxygen or both. On Earth, to the best of my knowledge, no life form employs fluorine in its metabolism, although fluorine is a common, widely available element. It is capable of immensely complex compounds, and could take part in a hydrogen-carbon-fluorine metabolism, or in an even more complicated hydrogen-carbon-oxygen-fluorine system.

Either of these two would, incidentally, yield the ultimate in indigestible "foods" from a Terrestrial metabolism's viewpoint! Most of the compounds would be violently and excessively toxic; the rest would be utterly indifferent to normal digestive processes.

DEVIOUS WEAPON

BY M. C. PEASE

Essentially, the trouble came down to this; you can make a machine play chess, but you'll never make a good poker player out of a calculating mechanism! It inherently lack one essential—

Illustrated by Quackenbush

The officer of the Minister of Foreign Affairs for the Federation of Worlds was in a turmoil. Men dashed in and out with harried looks. Secretaries typed at breakneck speed. The teletype in the corner rattled on without a pause.

The door opened and the minister himself walked in. He looked around grimly, with an eye that warned of dismissal or worse. His staff was very worried as he sat down and looked at his second-in-command.

"Now, tell me what happened, Jordan."

"Yes, Mr. Gorrell. According to the only messages we have received, either directly or through the ambassador from Dorn, Prince Kallin was expected to arrive a week from yesterday. Inasmuch as we hoped to

obtain extensive concessions from him, we were preparing to receive him with full honors and the most elaborate ceremony. This, you will remember, was the course recommended by the Political Science Calculating Machine as the result of an integration of all known factors."

The minister gave an impatient nod.

"Yes, yes. I know all that. Get on with it."

"Yes, sir. Yesterday afternoon, we got word that a man had registered at the Hotel Biltwood as Prince Kallin. As we wished to avoid any embarrassment when the real prince arrived, we failed to notify Ambassador Lorin, and requested the police to pick the impostor up. According to reports, he offered only token objections. A

search of his baggage confirmed the idea that he was deranged. Weird carvings and paintings were the most obvious aberrations. There was also quite an arsenal of pistols and knives. He was, therefore, taken into custody for observation."

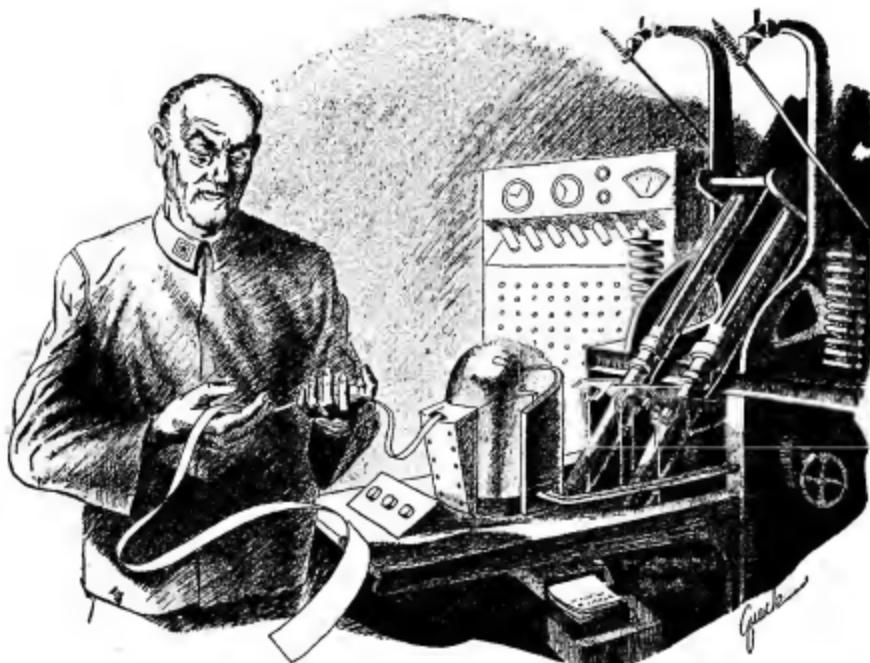
"Go on." The minister's eyes bored coldly into those of his subordinate.

"At the police station, sir, it was discovered that he did, in fact, carry a Dorn passport, in the name of Kerlon Peymor. We then notified the ambassador who came down. And then we learned that he is, in fact, Prince Kallin." Jordan spread his hands, helplessly.

"We released him immediately, of course, with full, official apologies, which he seemed to accept. Very decent about it all, in fact. But, of course, that's a minor point. Even if he doesn't make trouble, we will have to make new plans."

"I don't, offhand, see much to blame you for. I'll try to save you if I can. But the dictator wants Dorn. If he does not get it, I may not be able to help you." Jordan shuddered as he looked down the long road to the concentration camps, from which so few returned.

Gorrell went on: "Why did he do it? How did he come here, and why?"



"We are looking for the background, sir," Jordan replied. "He came in a small cruising spaceship that landed yesterday at Narob Field. The ship was registered in the name of Peynor, which, apparently, sir, is one of his many legal names. Four men disembarked with him. Their names mean nothing to us and they have disappeared. All in all, sir, it was as inconspicuous an entry as could have been legally arranged.

"As to why, we don't know. He simply says that he thought it might make things interesting. It looks as if he expected and wanted to be arrested. It doesn't make sense to me, sir. The problem has been given to the Political Science Machine. No answer yet, of course."

"We've got to find out why, Jordan. Until we do or the Machine deduces it, we don't know where we are. Until we do, just hold your breath and pray. I'll go talk to him."

It was evening when the minister's party called on Prince Kallin. Diplomacy is normally conducted according to very strict rules of decorum. It is not usual for a visiting delegate, no matter how high, to receive an official visit in a brilliant green smoking jacket with a highball in his hand. Nor was the blond girl who sat on the couch with her feet tucked under her a normal ornament for such an occasion. It did not really improve things when she was introduced as a reporter collecting

background on Dorn. Even so, it might have been all right, except that the prince insisted she stay. The minister's party felt decidedly ill at ease.

But Gorrell was a rugged man. One must be to be a minister under a dictator. To be able to maintain one's wits under all sorts of trying and confusing circumstances is a prime requisite of the job. After one flicker of confusion, his face became impassive and his manner watchfully courteous. His subordinates took their cue from him.

After introductions had been completed and each man supplied with a glass, Gorrell delivered the full apologies of the Federation. The prince, however, waved them aside.

"None but formal apologies needed, sir," he said with a smile. "I fully realize I should have expected nothing else. In fact, I didn't. I assure you I shall make no trouble about it."

Gorrell waited for further comment but, as none seemed to be coming, he opened the subject himself.

"To tell the truth, your highness, we are somewhat confused by your mode of arrival. It was quite opposite to the norm for people in your position." He paused.

"You would like me to explain, eh?" Prince Kallin replied with a smile. Gorrell nodded, deferentially. "I don't mind. It is really very simple. It was obvious from the preliminaries to this business that you wished something from us. It has also been obvious for some time

that, ultimately, you would try to gain control of the League of Border States." Gorrell shook his head and started to object. But the young man, who had suddenly become deadly serious, ignored him.

"The only way you could do that in the near future would be to split the League. We decided that this was probably the opening gambit of that game.

"Normally, in such circumstances, we would arrive in full force with a large spaceship equipped with the largest Political Science Calculator we could get into it. We would then settle down to a long duel of words, using our Machine to analyze the implications in everything you said and trying to make no wrong implications, ourselves. That would have been all right if we were starting from a somewhat favorable position.

"In the present case, however, we decided we were starting from a position that was at best no better than even. And, we would be hopelessly out-gunned. I understand your Machine's reference file, alone, covers more than five square miles. Obviously, your reference data and file of patterns was far more complete than anything we could put on a spaceship. We would have refused to meet you had that been the best we could do. Our refusal would have weakened our position, but the sacrifice would have been the lesser of the evils.

"On analyzing the situation, however, we discovered we could elimi-

nate the machines entirely, and reduce the situation to one man horse trading with the other. And that is what we have done. I doubt if you will get many answers from your Machine while I am here." He smiled coldly.

"But what has that to do with your manner of arrival?" Gorrell asked, puzzled.

"That is up to you to figure out," the prince answered, and smiled.

The rest of the interview was most unsatisfactory to the minister. The young man blandly ignored all further attempts to draw him out. Direct questions he refused, in a direct manner. Gorrell finally gave it up and simply made arrangements to start a full dress conference in two days.

He began to regret that quite soon. In the first place, he discovered the prince had not been fooling. Something had definitely happened to the Political Science Calculator. On all problems regarding Prince Kallin or Dorn, it gave no answer at all. On being presented with one, the sign would flash on saying: "There will be a short wait during the process of integration." Only the wait was not short. It would apparently continue indefinitely, if permitted. Press of other business always necessitated the removal of the problem—unsolved.

But the difficulty rapidly became more serious, still. Irrational answers to other problems of government began to appear. And if ques-

tions were resubmitted, different answers would be given. New and totally different answers to old problems would be given upon the resubmission. The process of the dictator's government began to flounder uncertainly, as the leaders realized that the Machine had become unreliable.

Naturally, the technicians in charge of the Machine dove deep into its vitals. Sabotage was whispered. If so, it was subtle. Each unit checked out satisfactorily. Test questions that activated only certain sections were answered reliably. And the total of these test questions used all parts of the Machine and most possible groups of parts. Yet the operation of the Machine as a whole steadily deteriorated.

Gorrell became frantic. To his mind, sabotage was the only answer. He thought only of the four men who had come with the prince. The entire police, secret police, and other investigative bodies were alerted. But no trace was found.

The girl reporter, known as Gerry Towne, who had been with the prince when the minister had presented his apologies, was brought in. Her past record was strictly that of reporting. Her present activities were confined to Prince Kallin and getting background on Dorn. The minister read with approval the first draft of a feature story she was writing. Interesting, he thought, and with several items of good propaganda for the Federation.

Actually, she did not help much.

She gave a detailed report of the prince's activities, but they were too blamed normal, considering the man. Night clubs and sight-seeing. The story of a man intent on having a good time. And in a position to succeed.

The minister thought again of the four missing men.

The conferences proceeded no better. The prince would sit and doodle away on a piece of paper. He left the talking to the Federation men. When they made a proposal, he would answer with a simple yes or no. And never could they get from him any hint of a reason why.

"The answer was no when you first asked it," he would reply to all their questions. "It is no now. And it will remain no. As to why, I just plain don't like it. Try something else."

Or, if he had agreed: "I agreed, didn't I? What more do you want? You gave a bunch of reasons why I should. Use any of them you like. Let's have the next point."

And nowheres could they find any system. Some of the ones refused most obstinately were their most simple and innocent filler clauses. Some that he accepted without hesitation were their trickiest sand-bagging ones.

Gradually the document grew. But as it grew the Federation men gradually came to realize that they did not have the faintest idea of whether it would serve their purposes or not. For the Calculator would give them no answers at all.

Gorrell became more and more worried. The loss of the Machine—for it was thoroughly unreliable by now—was slowly breaking down the whole administration of government. And the idea was spreading that he was responsible. The dictator, himself, had hinted darkly to him that things had better be fixed. And the Minister of Propaganda, directly in charge of the Machine and feeling the noose on his neck, was doing his best to tie it on Gorrell. Gorrell was a strong man. One does not become minister under a dictator if there is much weakness in one. But he realized he was breaking under the strain. The worst of it was that he could not conceive how it was being done to him. All he could think of was the four missing men.

The girl, Gerry, had been reporting to him regularly, if futilely. But he was surprised when she was announced one morning. It was not on schedule. He had her shown in.

"I hope you have something important," he glowered at her. "I am busy and I'm fed up with people wasting my time." She gulped but drew an envelope out of her pocket-book.

"He g-g-got very drunk l-last night," she stammered. "Very drunk. Was boasting how well he had you fixed." Gorrell sprang up with a curse. It seemed as if he would strike her. But, with a visible effort, he got control of himself.

"Sorry," he muttered as he slumped back into his chair. "Not

myself, these days. Go on. Don't be afraid."

"Well, he was raving quite a bit, as I was saying," she resumed. "Laughing and boasting. Finally, he started waving that around and said he would soon be able to sell you that. I asked what it was. He said it was the treaty you would soon be begging him for." Gorrell's fist banged the table but he did not say anything.

"Either that, he said," she went on after a moment, "or he would tear down the whole . . . and he got very obscene, here . . . dictatorship. Then he quieted down and locked up the envelope. He said only one thing more that might be important. He said, and I think I have this straight: 'How long do you think this dictatorship will last without the Machine?' And then he went to bed."

"How did you get it, if he locked it up?" the minister asked.

"He dropped the key into his pocket last night," the girl answered. "This morning he put on a different suit. I guess he was too drunk to notice."

"Or, he wanted you to bring it to me," Gorrell said softly. "Where is he now?"

"On a sight-seeing tour with one of your men, I think," she replied. "I wondered if it might not be deliberate. But he had drunk an awful lot. And it was a good show if it was an act. Anyway, I thought I ought to bring it."

"Yes. Of course. I'll get this

photostated right away so you can return it." With that he stalked out of the room.

He read the pages over the shoulder of the photographer. They seemed innocuous enough. But, since they had probably been written with a Calculator, there were probably several hidden jokers. To sign it would probably mean the end of the dictator's dream of absorbing the League. At least for a long time.

But, he thought, at this point that was not important. When a man has one foot already in the concentration camp, the dictator himself no longer counts. The blame would lie on the Machine. And it would be difficult to tie that on him once the fault was found.

Yes, he thought. The prince has made himself a deal.

Gorrell was not a man to waste time. He could, if occasion required, haggle for commas and bargain for spelling with complete indirectness. But he preferred the opposite course. When subtlety was not needed, he much preferred to waste no time. It was, therefore in that afternoon's session that he proposed Prince Kallin's version as his own.

When he had read it, with the comment that it was an integrated version which might be acceptable since the prince refused to present his arguments, Kallin looked at him obliquely with a half smile. His eyelid twitched with the merest suggestion of a wink.

The minister's subordinates looked startled. They had not heard of this version. They were not too surprised, however. On occasion, it had better served Gorrell's and the Federation's purposes to have them argue for objectives that were not the true ones. And a man can argue best for what he believes to be true. They were used to these surprises. They mentally shrugged and kept quiet.

The prince took the document and studied it. It was plain that he was interested in only a few paragraphs. Apparently he was satisfied by what he saw.

"Gentlemen," he announced after about five minutes, "this is interesting. I find myself torn between conflicting interests. Frankly, I am beginning to get bored, here. And I don't see any particular reason why I shouldn't sign this. And yet, I have been interested in your progress while the Machine is being repaired. However, as I imagine it will be fixed in a few days, and as things will be very dull then . . . yes, I'll sign it."

The formalities were quickly concluded.

It was the next day, as Kallin was having lunch privately with Gorrell that the other half of the bargain was completed.

"I am not going to tell you the facts," the prince told the minister, with a grin. "I want to be far away with the treaty when you learn them. But there is on this planet, a Dr. Albert Fenross, who is highly re-

spected in the field of the Symbolic Logic, or Mathematics of Social Science, on which the Machine is based. I understand he is in considerable disfavor for speaking his mind too freely. However, he is the best man you have. I believe, if you will lay all pertinent information before him, he will tell you what happened. You might suggest that this was a practical application of my recent work. He'll know what I mean."

"Will he need *all* the facts?" Gorrell asked.

"Yes," was the answer, "except possibly the source of the treaty draft. I imagine he will guess that, anyway."

"But at least tell me how any of the four men with you got in to the Calculator. That place is one of the best guarded in the Federation."

"Why, they didn't," Kallin replied. "They just holed up. All they did was give you something to chase while I did the dirty work." And again he grinned in a cold sort of way.

The minister was an efficient man. The prince had merely got space-borne when a truck arrived at Dr. Fenross' house filled with the records. A curt note ordered all possible speed. Guards surrounded his house while he worked.

It was less than twenty-four hours later that he announced he would like to see the minister. There was no delay. As he was ushered into Gorrell's office, the lat-

ter, with a cold look, waved him to a chair.

"You have solved the problem?"

"Yes." The mathematician was equally cold.

"That was quick work. I compliment you."

"I knew what had happened as soon as I had read the summary you prepared. I have spent the rest of the time preparing these notes by which your technicians can repair the damage, more or less." He tossed a handwritten sheath of papers on the desk.

Gorrell looked surprised.

"Can you explain it to me? Naturally I am curious."

"I believe so, if you can spare a little time." Gorrell nodded. As an afterthought, he offered his guest a cigar. The scientist thoughtfully lit it and nodded approval before continuing.

"I suspected what had happened as soon as I saw the name of Kerlon Peynor, under which his highness' ship was registered. I was not aware that he and the prince were the same one. A remarkable man—for Peynor is probably the single outstanding mathematician in the Social Science field in space today. The recent series of papers to which he referred were on theoretical limitations of the Machine. Do you begin to see the story?"

Gorrell shook his head and looked puzzled.

"What, exactly, did he do?"

"He arrived. And that, sir, is all he did."

"I don't get it."

"Consider. The Machine employs logical tools. In its operations, it is very much like a brain, except that the brain can ignore or, at least, repress what it has to. The Machine cannot.

"Peynor arrived. He carefully used that name to make sure the Machine did not miss the point that he was the outstanding expert on the limitations of the Machine. Just to reinforce it a bit, though it was probably not necessary, he told you that he chose his manner of coming to paralyze the Machine—which nugget of information you blithely cranked into it, thereby completing the process. After that he did precisely nothing. When he was accepting or rejecting clauses, I imagine he flipped a coin to decide. Or had some other system to avoid system. There was nothing coherent the Machine could grasp. So the Machine went crazy."

He leaned back and puffed his cigar. After a moment, as the minister still looked puzzled, he went on.

"The Machine knew that Peynor wanted to destroy it. And it knew that he could do this if anyone could. Further, by his exhibition of confidence, it became highly probable that he had a plan he knew would work.

"Now the Machine is quite capable of dealing with a plan to destroy or circumvent it. In fact, it is used to it. Under the present administration, that's its main job. But it

can only handle such a problem if it has some idea of the plan.

"The machine knew, with high probability, that Peynor had a plan. But he carefully avoided giving it any rational starting point. Therefore, to handle the problem, it had to consider the sum total of everything it could not do. It had to integrate over the range of its own limitations. And that is precisely what it could not do."

The mathematician puffed on his cigar a moment with bland approval.

"The basic difficulty, you see," he continued, "is that the Machine, like the brain, cannot know the extent of its own limitations. If a human, for instance, could know them, he could devise a machine to handle the problem—which would be equivalent to handling it himself. At best, the brain can only know what it can do—not what it cannot do. And the most subtle and effective attack that can be launched against it depends on that fact.

"What Peynor, the mathematician, has done is to prove that, logically and in a more general form. The brain has a defense against that attack. It ignores it. If, however, we built an ignoring circuit into the machine, it would still be susceptible to a higher order form of attack since it must then decide if the problem must be ignored or not. And it always will be susceptible as long as it was devised by the human brain.

"To summarize then, what Pey-

nor, or Kallin, did, was to set before the Machine the one intolerable problem. He asked it to determine where it was vulnerable. And as long as he committed himself to no particular line of action, the problem remained. And the Machine could answer no questions about him. In fact, as the facts of the problem got introduced into others, it could no longer give consistent answers to them, either.

"It is fundamentally the situation a man is in if he knows that you have the knowledge, opportunity, and motive to destroy him—and then you do nothing. Maybe he can ignore the problem. The Machine could not, so we will assume our man can't either. So he sits on the edge of his chair waiting for your hostile move, so that he can counter it. Only as you don't make any move, he simply continues to sit there with all his nerves tensed up, waiting. Until his mind snaps."

The minister nodded. "Yes, I think I see that. But have you figured out the basis of the ignoring circuit?"

"Yes. That is what those notes are about. But let me warn you, the next higher order of the same problem will paralyze the Machine again."

"Could Kallin present it, do you suppose?"

"I imagine so. The broad outlines of the method would be obvious to any theoretician. Tell me—are there any theoreticians among any revolutionary groups?" Gorrell jumped.

"What do you mean?" he shouted.

"I mean it would be embarrassing to have the Machine go crazy during a crisis. I wonder if the dictatorship hadn't better try to exist through the will of the people, rather than merely their acquiescence. I am only suggesting it." He smiled wryly.

Gorrell sank into thought. Finally he shrugged his shoulders.

"Maybe so."

A final thought hit him.

"Say, if the basis of the attack was inaction, wasn't the treaty a positive action?"

"Certainly," the scientist replied. "But then it was too late, wasn't it? If by any conceivable chance you knew he wanted that particular treaty, you could have broken the paralysis of the Machine with that information."

Dr. Fenross smiled mockingly at Gorrell's stunned expression. Quietly he got up and walked out.

THE END

THE UNDECIDED

BY ERIC FRANK RUSSELL

They'd never succeeded in trapping an Earth-ship before; now they had one they found it distinctly hard to handle. And, worst of all, the intelligences of Earth were incomprehensible!

Illustrated by Cartier

Peter the Pilot made his crash landing with skill deserving of all the huzzahs he did not get. It is no small feat to dump a four-hundred tonner after a flying brick has loused up the antigrav and left nothing dependable but the pipes.

The way he used those tubes verged on the superhuman. They roared and thrust and braked and flared and balanced so that ultimately the vessel hit with no more than a mildly unpleasant thump that added nothing to the damage. For the time being the ship and its eight-man crew were safe. Or, to be more precise, its crew of seven men and one woman were safe—if there is any safety in an unknown and possibly hostile world.

While the others telepathed their congratulations which modestly he

shrugged off, Peter the Pilot remained in his seat, locked in the control cabin, and studied what was visible of this strange planet. The armorglass window mirrored a ghostly reflection of his blue, thoughtful eyes which were set in a face queerly suggestive of youth preserved to great age. Even his hair showed the silky whiteness of the very old, yet somehow remained lush and strong. Making no attempt to get out, he sat there and thought because it was his duty to think. Subconsciously he was aware that three of his crew already had left the vessel and that the others were retaining mental contact with them.

They were eight Terrans temporarily marooned far off the beaten tracks. He wasn't unduly worried about that because the ship was re-



pairable and they had enough fuel for return. Moreover, the fact that three had gone out showed that this world could be endured. It would permit life: a point already suggested by its superficial resemblance to Terra as seen through the armor-glass. No, the worry was not an immediate one. So far, so good. Sufficient unto the day is the evil thereof. The trouble which most encouraged him to ponder was that repairs take time, a long time, and menacing complications not present today can arrive tomorrow or next week.

The prospective threat he had in mind was that other life-form of shape and powers unknown. They had ships, slow, cumbersome, too short-ranged to overlap the Terran sphere of influence, but still ships. Manifestly they had intelligence of a high order.

For twelve centuries this other-form had chased in fruitless pursuit of every Terran vessel straying within their range and had enjoyed the doubtful pleasure of seeing each one's rapidly diminishing rear end. It is galling to have one's curiosity repeatedly stimulated and left unsatisfied, even more galling to know that the interest is not reciprocated. Peter the Pilot had no notion of what bizarre form this other-life might take but he was willing to gamble that they had no teeth—having ground them away long ago.

Now there was excellent chance of a snoopover and much express-

ing of resentment if the ship remained pinned by its pants, for misfortune had dumped it right in the other's bailiwick. Not even a Sirian Wotzit, he decided, would resist a sitting duck. Hitching his shoulders fatalistically, he opened his mind to the mental voices of his crew.

Rippy the Ranger was saying, "Found a stream. The water is drinkable."

"*You* found it?" harshed Sammy the Sharpeye. "How do you discover something to which you've been directed like a small child?"

"I went the way you told me and I found it," came back Rippy. "Does that satisfy you? Why don't you trim your nails and take a pill?"

Peter sent out a call, "What do you see, Sammy?"

"Trees and trees and trees. You sure picked a hideout—if it will do you any good." Silence, followed by, "I can also see a strange, repulsive, nightmarish shape lurking by the stream. It is guzzling the water because there's no charge. Now it is scowling horribly and—"

"Leave Rippy alone," ordered Peter. "Where's Kim?"

"Don't know," admitted Sammy the Sharpeye indifferently. "He got out fast and vanished some place. You'll hear Hector swearing pretty soon."

"Oh, no you won't," interjected Hector the Hasher, his mental impulses strong because of his nearness within the ship. "I had ten locks on the galley, see? I've made

landings before, and with a load of gutsies at that!"

"Kim!" called Peter.

Silence.

"When will that guy learn to keep his mind open and respond," Peter complained.

"When he's hungry," offered Hector morbidly.

A new tone chipped in, hooting with irritation. "Let . . . me . . . sleep, willya? I gotta catch up . . . somehow!"

"Nilda the Nightwatcher," sighed Hector. "Nilda the Nuisance I call her. What makes her that way?" He paused, then his thought-form boosted with sudden outrage. "Clobo, take your mitt outa that can! By the—"

Peter cut them off while he writhed out of his seat, had a closer look through the armorglass. He was surveying a tiny portion of a world which itself was small part of an alien system and a corresponding fragment of the great unknown. As a representative of a nearby empire firmly founded upon swiftness and sureness of personal decision, he stood ready with the rest to face decisively whatever might befall. Apprehension was not within him, nor the elements of fear. There was only estimation, calculation, and preparedness to decide.

After one million years of Terran growth and mutual acceptance of the consequences of growth, nobody thought of themselves as peculiarly undecided.

Sector Marshal Bvandt slurged in caterpillarish manner across the floor and vibrated his extensibles and closed two of the eight eyes around his serrated crown and did all the other things necessary to demonstrate an appropriate mixture of joy, satisfaction and triumph.

"One is down." He smacked his lips. "At last. After all these years."

"One what?" inquired Commander Vteish.

"A mystery ship. A sample of those ultra-fast cylinders we've never been able to catch."

"No?" Vteish was astounded.

"Yes! It had an accident, or something went bust. The message has just come in but does not give details of what forced it to land. Zwilther was following it in the CX66, and losing distance as usual, when he saw it go off-curve. It chopped around a bit, still at high clip, then made for Lanta."

"Lanta," echoed Commander Vteish. "Why, that is in our sector."

"A most remarkable coincidence," observed Bvandt sarcastically, "seeing that any emergency message is automatically directed to the marshal in charge of the sector it concerns."

"Of course, of course," agreed Vteish hurriedly. "I overlooked that much in the excitement of the moment." Dutifully he slurged, vibrated and performed the eye-shutting to remind his superior that

they were two hearts beating as one. "Now what?"

"Lanta is sparsely settled. Its people are simple scrabblers in the dirt. I have sent an order warning them not to interfere with this alien cylinder, to keep clear of it. We cannot permit a gang of hicks to handle a case of this magnitude. Too much depends upon it and such an opportunity may never occur again. Our best brains are needed to make the most of it."

"Definitely," indorsed Vteish. "Undoubtedly."

"Therefore I am going to deal with them myself," announced Bvandt.

"Ah!" said Vteish, carefully using his speaking-mouth. He had two mouths, one on each side. The penultimate insult was to make eating motions with the speaking-mouth. The ultimate:—to make garbled speech-noises with the eating-mouth. For a moment he had been sorely tempted.

"And you are coming with me," Bvandt went on. "Also Captain Gordd and Captain Hixl. We'll take two ships. We'd take fifty if they were immediately available, but they aren't. However, these two are of our latest and most powerful pattern."

"Couldn't some of the other vessels be summoned?"

"They have been called already, but it will take them some time to reach Lanta. We cannot wait for them, we dare not wait. At any time this alien contraption may be

away faster than zip. We have got to deal with it before it becomes too late."

"Yes, marshal," admitted Vteish.

"What luck! What a gift!" If Bvandt had possessed hands, he would have smacked them together with the acme of delight. So he jiggled his extensibles in the nearest equivalent. "Now is our chance to get the measure of this other-life while leaving it ignorant concerning ourselves. After preliminary study of them we will test their defenses by a light attack. Finally, we'll seize their vessel, dig out the secret of its speed and maneuverability. All that knowledge, my dear commander, will give us our biggest boost in twenty lifetimes."

"A boost in one lifetime is enough for me," said Vteish with unashamed cynicism. "I was peculiarly disinterested before I was hatched and expect to be strangely indifferent after I'm burned." He humped toward the coolness of the wall, leaned against it and mused. "Do you suppose that this other-life might be . . . might be . . . like us?"

"I see no reason why not," declared Bvandt, after some thought. "We are by far the highest form in the known cosmos, therefore any other high form must be similar."

"The logic of that is not evident." Vteish drew a crude sketch on the wall. "They might be like this, for example."

"Don't be stupid. Why should-

they resemble anything so fantastic?"

"Why not?"

Bvandt said severely: "You are too fond of those dream-plays at the festivals. You have leanings toward mental extravagance. Your brain spends half its time conjuring crazy visions for lack of anything better to do." His rearward pair of eyes examined the time-meter on the wall. "Your cure is at hand—you can get busy right now. The ships will be ready within the hour and I shall tolerate no delay on anyone's part. See that you are packed and on board in good time."

"Yes, marshal. Most certainly, marshal," promised Vteish, again carefully using his speaking-mouth.

From the eastward rise over which the trees marched in solid ranks the Terran vessel could be seen as if lying in a hollow. Slight gain in altitude added considerably to the angle of view.

Like a big, fat slug, Bvandt stuck sucker-footed to the bole of a tree while he applied a powerful monocular to one eye and closed the others. The field of vision did not shift or tremble, for under the monocular his extensibles were braced together and formed a fulcrum much steadier than Terran hands.

Adjusting his instrument's focus, Bvandt got a clear, sharp view of Peter the Pilot sitting on the bottom rung of his vessel's landing ladder and smoking a pipe. He almost fell from the tree.

"By the egg that held me!" Detaching his optic from the eyepiece, he bugged the others, stared around. "Do you see this thing?"

"Yes," said Vteish calmly. "It has only two legs, longer and skinnier than ours. Only two eyes. Its upper limbs bend always in the same places as if they are hard-coded and jointed."

"I see it, too," put in Captain Gordd, who was high on an adjacent tree. He spoke with a kind of incredulous hush. "It resembles nothing on any of our twenty-four planets."

"The question is," said Bvandt, "how many more of these creatures are inside that ship?"

Gordd pondered it, guessed: "Any number between ten and twenty. Possibly thirty, though I doubt it."

Having another long, careful look, Bvandt pocketed his monocular, inched down the trunk, gained the ground. "Hurry up with that pictograph."

One of the men descended from his vantage point, did things to the boxlike instrument he was carrying, eventually produced from it a large photo of Peter complete with pipe.

"Well, we've a record of how they look," grunted Bvandt, studying the picture closely. "I would never have believed it if I hadn't seen for myself. Fancy thousands of things like this!"

"Millions," corrected Vteish, joining him.

"Yes, millions, all like this." He

handed back the photograph, saying: "Prepare copies for transmission to all sector headquarters." Then to Vteish, "Now we'll find out what they've got." He called a nearby trooper. "Get as near as you can and shoot."

"To kill?" asked the trooper.

"To kill," Bvandt confirmed.

"It that necessary?" Vteish chipped in, greatly daring.

"It is essential that we have a demonstration of their strongest, most desperate reaction," Bvandt said stiffly. He eyed the trooper. "Well, why do you wait? You have your orders!"

The other shuffled off between the trees and into the undergrowth toward the alien ship. The sound of his passage ceased as he dropped to a cautious creep. Beneath the trees the rest waited for the shot and the resulting uproar. Twelve were high in the trees ready to observe and record the other-life's methods of defense.

Sitting mild-eyed and sucking his pipe, Peter the Pilot listened, listened, not with his ears but with his mind. Sammy the Sharpeye's tones were coming to him coolly, without emotion.

"They are in the trees a mile to your front. I've been near enough to make certain that they're still there. Boy, what a gang of slooperoos! They sloop and slurp this way and that. They've eight eyes apiece, all on top, but swiveling independently. They've refused to

see me so often that I wonder if I'm getting transparent."

"Not with what you're full of!" cracked Rippy's thought-form.

"Shut up!" ordered Peter. "This is a poor time for cross-talk."

"The trees are the trouble," went on Sammy. "They hide too much. Clobo ought to be able to tell you more than I can."

"So at last it is admitted that Clobo has his uses," interjected that worthy. "Clobo comes into his own —during his bedtime. No sleep for the wicked!" He managed to put over a deep mental sigh. "And tomorrow all will be forgotten."

"What do you see, Clobo?" asked Peter, projecting sympathy.

"They are conferring with ugly mouth-noises. It is evident that they are in no way telepathic."

"If they were they'd have overheard us long ago," Sammy pointed out.

"They appear to have reached some sort of decision and have sent away one who bears an object suspiciously like a weapon," Clobo went on. "This one is edging cautiously toward the ship. Now he sinks low and creeps. I have a strange feeling."

"Of what?" demanded Sammy.

"That he does not desire to blow kisses."

"Ho-hum," said Peter, knocking the dottle from his pipe. "I do not think it wise to take action myself until I know for certain whether or not his intentions are honorable."

"If you ask me, I wouldn't trust

him with Hector's can-opener," opined Clobo.

"Listen who's talking!" invited Hector.

"Now he has paused by a suitable gap and is pointing his weapon forward. If I could see into his alien mind, I'd find it bloated with mayhem. He is about to fire at you, I think. Rippy is hidden in the grass ten yards to his front."

"I shall now reveal myself," announced Rippy.

"Mind you don't get a slug in your bean," warned Peter. He screwed up his eyes as he tried to spot Rippy amid the vegetation more than half a mile away. Nothing could be seen; the growths were too thick.

Clobo's impulses now became a rapid series of high-pitched mental squeaks as he chattered at top pace like an excited commentator at a champ contest. One got the impression that he was jiggling up and down as he broadcast.

"Rippy gets to his feet and stares this guy straight in the pan. The sniper lets out a startled hiss and drops his weapon. Rippy doesn't move. The other recovers. Keeping all eight eyes and the whole of his attention on Rippy, he feels for his gun, finds it, picks it up. What's the use of having eyes all around if you don't use them? He's just leveled the gun as Kim arrives from where he isn't looking and jumps on his back. Whoo! Socko! Kim is tearing off lumps and giving them to the frogs. The other has rolled

onto his back, making noises with both mouths and waving his legs in all directions. Kim is now extracting his plumbing and draping it tastefully over the bushes. There's a funny sort of blue goo all—"

Closing his mind, Peter opened his ears. There were faint threshing sounds mingled with queer, unidentifiable noises deep in the far vegetation. He eyed the sky as if searching for something now at too great an altitude to be seen. Pulling out his tobacco pouch, he re-filled his pipe, tamped it down, sucked it unlit.

"... leaving only a rank and unappetizing mess," finished Clobo, worn out.

"Soup's ready," announced Hector, unimaginatively choosing the worst of inoments.

The three troopers sneaked back with their eyes wary on all sides and especially to the rear. Two told their story while the third worked at his box and gave the resulting pictograph to Bvandt.

"Torn to pieces?" said Bvandt incredulously. They made nervous assent. He stared at the pictograph as it was placed in his gripping extensibles. He was appalled. "By the great, red, incubating sun!"

"Let me see." Vteish had a look over the other's ropey limb. His first, second and third stomachs turned over one by one. "Sliced apart with a thousand knives!"

"They must have been lying in ambush," decided Bvandt, not

bothering to wonder how the ambushers had known where to place themselves. "Several of them. They attacked with the utmost ferocity. He never had a chance even to use his weapon." He turned to the silent troopers. "That reminds me —where is his gun? Did you retrieve it?"

"It was not there. It had gone."

"So!" Bvandt became bitter. "Now they have a gun. One of our guns."

"Only a common hand-gun," soothed Vteish. "We have others bigger and better. They don't know about those."

"What do we know?" Bvandt snapped. "Nothing—except that they have knives."

"Super-fast ships and ordinary knives," Vteish commented thoughtfully. "The two items just don't go together. They seem incongruous to me."

"To eternal blackness with the incongruity!" swore Bvandt. "Their sharp blades have proved superior to our guns. They have made a kill while we have not. I cannot tolerate that!"

"What do you suggest?"

"We'll try again in the dark." Bvandt slurred to and fro, his voice irritable. "I do not expect to catch them asleep—if they do sleep—for they will keep watches now they know we're around. But if by any chance they are less accustomed to darkness it will give us some slight—"

He stopped as metallic clangings

sounded from the distant ship and one of his treetop observers called urgently. Mounting the bote, he used his spyglass.

Something had emerged from the Terran vessel. It was a bright, new and entirely strange shape bearing no resemblance to the two-legged creature previously observed.

This one was rhomboidal in side-view and shone beneath the sun. It possessed no legs and appeared to move upon rotating but unseeable bands, or perhaps on hidden rollers. Many limbs projected from it at the oddest angles, some multiple-jointed, some tentacular. Trailing behind it a long, thick cable which ran back into the ship, this weird object trundled partway toward the tail end bearing in two of its limbs a large, curved metal plate.

While Bvandt watched pop-eyed, the newcomer turned its back on far-off observers, held the curved plate to the ship, applied something to one edge. An intense and flickering light bloomed at the end of its extended limb and crawled slowly up the plate's side.

"Welding!" offered Vteish unnecessarily.

Bvandt scowled, glanced higher up his tree, said to the pictograph operator above him, "Are you recording this?"

"Yes."

"Make several records while you're at it." He looked downward upon half a dozen fidgeting troopers. "You six go a quarter circle round while remaining within gun-range

of that vessel. Keep together. Don't separate no matter what happens. Find a good aiming-stand no nearer than you can help and give that legless nightmare a volley. See that you hit it—I'll flay the one who misses!"

They moved off obediently but without eagerness. Bvandt went a little higher up the tree, squatted in a crotch, kept his glass centered upon the shining alien which continued to concentrate upon its task as if it had not an enemy in the whole of creation. Vteish, Gordd and Hixl all had their monoculars aimed at it. The pictograph operator maintained it in his screen.

Slowly, uneasily, the troopers crawled round, their senses alert, jumpy, yet unconscious of other eyes watching, other minds talking.

To the waiting Bvandt the execution squad seemed to take an interminable time. He was toying with the morbid notion that already they had met a silent but terrible end when the hard cracks of six guns made him jerk in his seat. The brief swish of the missiles could be heard distinctly, and even louder were the fierce clunks with which they struck their target.

The brilliant welding light snuffed out. Its shining operator slid three feet noseward, stood still. Tense seconds went by. Then calmly he applied his limb to the opposite seam, the light spurted afresh and the weld-line crept upward.

There was a word so rarely used that some had never heard it in a

lifetime. Bvandt not only employed it, but distorted it with his eating-mouth. Vteish was shocked, Gordd astounded, Hixl filed it for further reference.

Then while they watched, the two-legged, two-eyed thing appeared. It came out of the ship, pipe in mouth, a tiny gadget in its hand. The most that their monoculars could determine was that the strange instrument had a hand-grip topped by a small platform on which a little tube of pencil-like proportions pointed upward at a high angle. The two-legger squeezed the handle, the tiny tube spat fire, sprang from its platform and speeded into invisibility. A thin arc of vapor hung high to mark its passage.

Enough silence followed to make this performance seem pointless. It ended with a gigantic thunderclap and a distinct quiver in the ground. Over to the right, where the hidden squad lay low, a great tree sprang five or six hundred feet into the air with a ton of earth still sticking to its roots. Other trees leaned side-wise and toppled as if to provide room for it to fall back.

Of the six troopers there was not even a bluish smear.

Climbing tiredly onto his bunk, Peter the Pilot wound the chronometer set in the wall, looked through the tiny three-inch port at the darkness outside, lay back and closed his eyes. Something weightily nonchalant and stone-deaf trundled



noisily through the ship, made many clatterings and clinkings.

Hector's thought-form came through with a touch of exasperation. "Good as he may be, I maintain there's plenty of room for improvement. Why can't he be telepathic? If they'd found some way to make him telepathic, I could put over some choice remarks about juggling hardware in our sleeping hours."

"Anyone who can respond to anxiety about mechanical matters, and jump to the job, is a marvel in

my opinion," offered Peter. "Be thankful that he's got a one-track mind and sleeps only when there is nothing to do."

"That's just when *I* want to sleep," complained Hector. "When a lot of bellies aren't hanging around me rumbling for chow." A raucous rattle like that of a pneumatic hammer came from near the tail, and Hector yelped: "Get a load of that! Aren't I entitled to some shut-eye?"

"I don't remember you screaming about my rights when I was fooling

around in my bedtime," Clobo's mind put in.

"Bedtime!" scoffed Hector. "Any guy who says daytime is bedtime is too daffy to have any rights."

"The trouble with this ship," interjected Sammy, "is too many incurable yaps. My patience is running out fast. Pretty soon I'm going to give up all pursuit of sweet dreams and go around cutting myself a few throats."

"Bah!" said Hector feebly.

Clank-whirr! Nobody took further notice. Closing his eyes again, Peter drifted slowly away. As usual, his astral body beat it back to Terra where—on an average of once a week—it roamed its dream-town and—perhaps once a month—canoodled its dream-blonde.

This proved to be one of the times when the said blonde was among those present. She was facing him across a table, looking bright-eyed at him over a vase of flowers, when suddenly her conversation made a switch.

"But, dear, if we buy this planetoid just for ourselves, you'll have to leave the service because it doesn't make sense for you to run off and—" She paused, then said sharply, "Peter, you are dreaming! *Wake up!*"

He sat up wide awake, still feeling the shock of it.

"All right, Dozey," came the mental impulses of Nilda the Night-watcher. "Fun's a-coming!"

"I'll say!" indorsed Clobo, with relish.

"What do you see, Nilda?"

"A big gun. They've brought it from one of their ships and are now hauling it up the other side of the rise. Reckon it will take them about an hour to reach the crest."

"Do you think it might be powerful enough to damage our plates?"

"For all I can tell it might be able to splash us over the landscape. It is no toy. It takes about sixty of them to drag it along. The trees are impeding them more than somewhat." She was quiet for a time, gave several little indistinguishable mutterings, then finished: "You're the official think-box. What do you want me to do about this?"

"If you gave me the precise range and angle with reference to this ship, I could donate a hoister," he mused. "But that would tell them something about our heavy armament. The light stuff doesn't matter. I'd rather not use the heavy if it can be avoided. Besides, it might shake us to pieces while we're grounded."

"So what?" invited Nilda.

"So I'll leave you a medium disruptor at the bottom of the ladder. You can plant it where it will be most disconcerting."

"All right," agreed Nilda with lack of emotion strange in a female.

Clobo promptly screamed: "Give me time to get clear, you bug-eyed assassin! I'm right in the trees and almost over them!"

"Are you calling me bug-eyed?" demanded Nilda. "Why, you spook-faced runt, I've half a mind—"

"That's just it—you've half a mind," said Clobo. "Lemme out before it does me damage."

"Give him time to duck out," ordered Peter. "I'll check whether any of the others are roaming around in the dark." Grabbing his torch, he entered the passage, went from cubicle to cubicle. The remainder of his crew were there, all asleep but Rippy who was stirring in semiwakefulness. Dodging the rhomboidal object which trundled busily along the passage, he reached the armory, selected a small one-pound disruptor, placed it at the bottom of the ladder. Then he returned to his bunk, broadcast, "All set, Nilda," closed his eyes and tried to get back to the blonde.

Sleep refused to come. He found himself listening for Nilda coming to pick up the bomb though he knew he would not hear her. Although the three-inch port was on the blind side of the ship with respect to the distant gun, he felt impelled to glance through it every now and again. There were no more comments from Nilda or Clobo, and the others were deep in their slumbers. Silence lay over the outer world; there were no noises inside the ship apart from a steady hum and occasional clinks at its rear end.

After half an hour the trees facing the port lit up briefly in vivid crimson. The entire vessel gave a jolt. A terrible roar followed. The crew came awake with language more fluent than seemly.

"That was tricky," remarked

Nilda. "I had to move faster than the drop."

Four mental voices chorused sardonically: "Or you'd have ruined your make-up."

"Yes," agreed Nilda calmly. "Someone has to look decent."

Hector alone had the ability to make the answering noise telepathically.

Gloomily posing by the edge of the crater, and secretly impressed by its size as seen in the light of the new day, Sector Marshal Bvandt said to a land-force captain, "O.K., what's your story?"

"We stood guard in a ring, two body-lengths apart, all through the night. The whole of the ground between us remained under such close observation that nothing could possibly have slipped through unseen."

"So it appears," commented Bvandt nastily. He scuffed some dirt with three of his feet, watched it slide down the great hole.

"Nothing passed," insisted the captain. "We had constant watch on every inch of ground around the ring. We maintained that watch unbroken even after the explosion and right up to dawn."

"Yet this disaster occurred behind you. You were between it and the ship. Something must have caused it—some *thing*!"

"I cannot explain it. I can only say that no alien passed through the ring of guards." He was very positive about it.

"Humph!" Openly dissatisfied,

Bvandt turned his attention to a wounded trooper waiting nearby. "Well?"

"They had got the gun and its ammunition-trailer this far." Four of his eight eyes bent to stare into the crater. "I was following at short distance. All was dark and quiet. There was nothing unusual that I could see or hear, no noise, no warning. Then all of a sudden this happened." He used a shaky extensible to point at the hole. "I was lifted off my feet and flung against a tree."

"Nobody knows anything," spat Bvandt, kicking more dirt. "A gun, a trailer, two captains and sixty men go to blazes in one midnight blast—and nobody knows anything." He scowled at the land-force captain. "Did the alien vessel remain silent, undisturbed, all through this?"

"No." The captain fidgeted.

"Come on then, you fool, speak the rest! I am able to understand speech!"

"Immediately after darkness had fallen we heard the vessel's door open and close as if something had emerged, but there were no noises on the ladder, and in the darkness we could see nothing—if anything did come out. In any case, no attempt was made to penetrate our ring or even to approach it. Then toward midnight, and shortly before the explosion, the door opened and shut again. There were faint sounds up and down the ladder as if what was making them had come

out and gone in almost without pause."

"That," declared Bvandt with much ire, "is too revealing for words. It tells me practically everything I wish to know."

"I am glad of that," assured the captain, stupidly pleased.

"Get out of my sight!" Bvandt waved furious extensibles at him.

"We have scanners," remarked Vteish thoughtfully. "We have apparatus that can scan mechanically by night and day. What a pity we don't utilize it here."

"You are not ahead of me," Bvandt snapped. "You are several days behind. I considered the matter en route. Scanning equipment cannot be extracted from the ships, neither can it be operated without power supplied by the ships, neither can we bring the ships any nearer than they are."

"I seem to have heard of self-contained transportables," ventured Vteish, glancing at him. "Small ones with their own generators."

"You talk like an imbecile. Firstly, I cannot produce by magic a transportable we do not possess. A couple of sets are being brought by ships not due for many days. It is beyond even my power to accelerate them."

"Of course."

"Secondly," he continued testily, "I doubt the usefulness of these scanners when they do arrive. Whatever can blow up a big gun obviously can blow up a transportable viewer.

Thirdly, it is evident that this alien cylinder has some sort of unimaginable scanning apparatus superior to ours."

"In what way?"

"In what way?" echoed Bvandt, pointing all his eyes in dire appeal to the indifferent skies. "He asks me, 'In what way?' See here, Commander Vteish, we are upon the slope of a rise. The enemy vessel is over the other side. We cannot see it from here. It is out of sight because we are unable to view it through some thousands of tons of intervening dirt. No scanner we possess, no scanner we can conceive is capable of seeing straight through a hill." He nudged the other in emphasis—"Apparently *they* can see through a hill. How else could they know of the gun and strike at its precise position?"

"Possibly they have a contraption which employs sky-reflection in a manner similar to our electrocommunicators," suggested Vteish, striving to look profound. "In which case hills and mountains would be no obstacles."

"Bunk! *Kaminnit!* You are back in your dream-plays! Even if hills and mountains could be visually surmounted there would be nothing to see but treetops. How is it possible to devise anything so selective that it can dissolve the concealing foliage to reveal what is beneath?"

"I would not venture to argue the possibility," said Vteish. "I am content only to point." He pointed to the crater. "There is the incon-

trovertible evidence that despite every technical difficulty they can see and do see, through hills or through foliage, by night as well as day."

"That's what I've been telling you all along," exploded Bvandt. "You have argued right around in a circle. Do you talk for the pleasure of your own voice?"

He was still fuming when a courier arrived, handed him a message-cylinder which he unscrewed impatiently. Extracting the missive, he read it aloud.

"Have received your pictograph of biped other-life. Good work!" Crumpling the paper, he tossed it into the crater. "Headquarters calls it good work. For lack of their support it has been mighty bad work so far."

"There is another," said the courier, offering a second cylinder.

Bvandt grabbed it, read, "Have now received pictograph of skew-shaped, multi-limbed, legless other-life, and cannot reconcile this with record previously delivered. What is relationship? Clarify without delay." He glared at the courier who edged away self-consciously. "Clarify without delay. Do they think I am omnipotent?"

"I am only the courier," reminded the other.

A pictograph operator arrived before Bvandt could find another avenue for expression. He had his box in one bunch of extensibles, several glossy sheets in another. His expression was slightly befuddled.

"Well?" demanded Bvandt, glowering at him.

The operator gabbled nervously: "Last night we set boxes in trees on the order of Captain Hixl. They had black flashes and snare-lines attached. As expected, we got several records of tree-lizards." He held out the sheets. "We also got these. We might have got more if some boxes had not been destroyed by this explosion."

Snatching the sheets, Bvandt gave them the eight-eyed stare. Both his mouths worked around and his body humped with shock.

Three of the sheets showed different aspects of the same fantastic thing. It was sitting on a branch as if out to enjoy the air. It bore a perfunctory resemblance to the two-legged pipe-smoking creature first observed, for it had two legs, two jointed arms and somewhat similar form. But it was far smaller and, moreover, possessed a single tentacle which was curled around the branch on which it sat. Its tiny, impish face held a pair of tremendous eyes which stared from the picture like twin moons.

"By space!" swore Vteish, breathing close. "What an object!"

His breath jerked out in a sharp hiss as Bvandt shuffled the sheets to show the others. These depicted another, differently shaped but equally nightmarish thing also on a branch. It had a pair of three-fingered hands in lieu of legs, and no visible arms, tentacles or exten-

sibles. Apart from the hands which gripped the branch it appeared limbless. Its body made one smooth curve on each side and the outlines of it were peculiarly fuzzy.

What got them most was the face, the awful face. Flat-topped, with demoniac horns at the sides, it had a great, menacing nose jutting between a couple of huge, glowing eyes still larger than those of the thing on the other sheets. Even in picture form those enormous optics fascinated them with the hypnotic quality of their cold, haughty, all-observing stare.

"Now we have *four* forms," mourned Bvandt, unable to tear his gaze away from those immense eyes. "You can see what is going to happen. I will transmit these to headquarters. In due time they will send acknowledgement." His voice changed to a mocking imitation of the stiff, officious tones beloved of bureaucrats. "Have received your pictographs of two more other-life forms. Reply without delay stating which of these is the master-type and define the relationship of the others."

"I do not know what answer can be given," Vteish confessed.

"No answer can be given—yet." Bvandt made an irritated gesture in the general direction of the alien vessel. "In the name of the eternal cosmos, why can't they make up their minds what shape and form they're going to take? In the name of the red sun, blue sun or any other sun, why can't they decide on

one particular identity and stick to that?"

"Possibly their nature does not permit a decision," theorized Vteish after exercising his mind. "It is thinkable by me that they are all of the same type but, under some alien compulsion with which we are not familiar, are impelled to change shape from time to time. They may be creatures who can't help altering at certain moments, in response to certain impulses."

"Anything is thinkable by you," scoffed Bvandt. "Sometimes I wonder why you don't leave the service and become a constructor of dream-plays." He stared again at the great eyes of Clobo, the greater ones of Nilda. "We must solve this problem forthwith."

"How?"

"We have two choices. For one, we can make an assault in full strength from every direction, using every trooper and the ship's crews."

"That may cost us many lives," Vteish pointed out. "And if we fail there will be no replacements for at least four days. It will take us that long to conscript a force of local settlers; longer if we wait for the other ships."

"I have considered that," said Bvandt. "I prefer the alternative plan, though it is risky. We can take up a ship and use its armament to wreck the alien vessel or, at least, damage it sufficiently to ground it for keeps."

"By space!" exclaimed Vteish. "I wouldn't care to try that! The

minimum velocity at which a ship is controllable means that you'd have to shoot in less than one-hundredth the blink of an eye. And hit the target. And fire while in a dive. And pull out in time to avoid plunging into the earth."

"I know, I know."

"Low level bombardment by spaceships is not possible because of the tremendous speeds involved."

"Many an impossibility has been achieved in a pinch," declared Bvandt.

Vteish said: "An ordinary air machine would be better."

"I agree. The idea is excellent, my dear commander. I congratulate you upon it. Please bring me an air machine."

"Perhaps the settlers—?"

"There are no air machines anywhere in the vicinity, none owned by any of the dirt-scrabblers. Do you expect all the amenities of civilization on this outpost world?"

He sniffed his contempt. "There will not be one solitary air machine available until the main fleet arrives—and that will be several weeks behind the first comers." He sniffed again. "We must make do with what we've got precisely as these aliens are making do with what they've got. We'll bring a ship into action and hope for the best. When that fails, if it fails, I'll consider risking an assault and take a chance on losses."

"How about flying a bomb-carrying kite with an automatic release?"

asked Vteish, picturing himself among the casualties to come.

Bvandt responded generously: "I will give the bomb if you will provide the kite and the necessary mechanism and clear away ten thousand infernal trees." Glancing upward, he added in different tones, "It has just occurred to me—what outlandish thing may be sitting up there now, hidden by the leaves, listening to us, glaring at us goggle-eyed?"

"Eh?" Startled, Yteish followed his gaze. So did several troopers. With a coldness upon them they ignored the many sky-gaps and studied the silent trees.

Their mistake lay in not looking higher, much higher.

Sammy the Sharpeye's mind cut through the ether saying: "One of their vessels is warming its main propulsors."

"I guessed it," answered Peter. "I can hear the dull roar of them from here." He paused while he thought it over. "Are there any of these eight-footed uglies hanging around me?"

"A ring of watchers," came Rippy's thought-form. "They're keeping at good distance, up in the trees, as if they're sort of nervous."

"Do you think they saw you boys go out?"

"A jump from a hole straight into deep brush doesn't tell much. You see something, you know it's something, but you don't know what. So you stick to the trees and say

your prayers. Anyway, they've not seen me since. Kim neither." Rippy sounded contemptuous.

"Kim!" called Peter.

No reply.

"What's the matter with Kim?"

"He's laconic," said Rippy. "Aren't you, Kim?"

"Speechless," corrected Hector, "with snatched food."

"There are times," snarled a menacing thought-form, heard for the first time in days, "when I am tempted to change my diet." Then, more sharply, "There's a dope on the ground, Rippy! Crawling toward you, dragging a box. Do you want him, or shall I take him?"

"This one's on me," said Rippy.

Sammy chipped in again with: "They are now closing all vents and trimming ship for a take-off, leaving troops on the ground. The bow armament turrets are projected. Looks like they've a notion to blow off somebody's britches."

"I'll check," said Peter calmly. Going to the control cabin, he switched the space-radio, sent out a call, listened. He repeated several times without result. "No Terran in this sector," he told Sammy. "So that means there's nobody to shoot up but us. Heck, that's going to be a chancy business with a spaceship, even one so slow as theirs are."

"Reckon they're going to risk it, all the same," replied Sammy. "I'm nicely set to copy Nilda's tactics, but a one-pounder won't get me much. These ships need something more."

"We'll give them more," decided Peter. "Get me the range and bearings."

Knowing that this would take Sammy a minute or two, he used the interval to broadcast a wordless but definite anxiety, an aching concern about a mechanical matter. The thing now listed by the pictographs as superior life-form number two promptly dropped what it was doing, clanked and buzzed along the passage, helped him load a robot bomb and slide it out upon its launching-rack. That done, the noisy one returned to his task.

"Relative to your longitudinal axis, I make it forty-seven degrees leftward, exit side," Sammy informed. "Range: slightly over six miles—say six point two."

"I hate to do this because it tells too much," observed Peter. "So long as we remain in this jam we can't stop them learning something, but I don't feel like giving them more information than is necessary."

"You've about two minutes in which to relent, think up something better and bring it into action," Sammy commented. "The propulsors are reddening. They'll be boosting pretty soon."

"Ah, well, this is going to hurt them more than it hurts me." Shrugging resignedly, he tripped the trigger.

Twin rockets blasted, forced the winged projectile up to two thousand feet before their castings fell away. The intermittent jet-engine

took over and the bomb sped high above the treetops. Steadily it hammered into the distance with a noise like that of an asthmatic motorcycle.

Sitting on the empty launching rack, Peter swung his legs idly to and fro while his finger rested on the key of the little transmitter standing nearby. The staccato noise of the jet had now died away in the distance. Even the trees seemed to be waiting, waiting.

"Now!" rasped Sammy.

Peter pressed the key, held it down. Resulting sound took a long time to come; when it did arrive it was muffled by mileage and trees to no more than a dull thump. Later, a thin, dark column of smoke snaked out of the landscape partway to the horizon.

"That," Sammy was saying, with grim satisfaction, "is what I call a number one big-time smiffelpitzer! Bang on the button! I could feel it even from here."

Nilda's tones hooted irritably: "Aren't you guys *ever* going to let me sleep?"

"Shut up!" ordered Sammy. "They were lying nose to tail about four hundred yards apart. The one which was warming up lost most of what it was warming. Nobody has come out of it, either. Maybe you've laid them for keeps."

"What of the other vessel?" Peter prompted.

"That's without a chunk of its

bow. It could be repaired—in a month or two."

"It can't take off?"

"Definitely not," assured Sammy.

"Sle-e-eep!" wailed Clobo. "Ain't me and Nilda allowed any?"

"No more than I get when you two gabble all through the night," Sammy retorted.

"Lay off!" ordered Peter. "Let 'em have some peace and quiet for a while. Don't call me unless it's urgent."

He listened now. Sammy and the others remained obediently silent. With typical consideration he decided against winding in the launching rack, a process much lacking in slumbersome music. He felt a bit anxious about leaving it extended, for perforce the exit-trap had to remain open. But no matter.

Superior life-form number two responded to his momentary thought by clanking uproariously along the passage and winding in the rack. He did it right under Peter's nose, with great gusto, the maximum of noise, and complete indifference to the resulting flood of telepathic insults.

And that was that!

The most pungent portions of Sector Marshal Bvandt's speech were uttered with his eating-mouth. Moreover, he garbled the words and made simultaneous eating motions with his speaking-mouth. His whole performance set a new low in uninhibited vulgarity but was excus-

able on grounds of sheer exasperation.

Having reached the end of his impressively extensive vocabulary, which included a description of the aliens as a cosmically misbegotten shower of *nifts*, he snarled at Vteish, "Now count 'em."

Vteish went around adding them up, came back, said: "One ship's crew intact, plus three survivors from the other. Also five land-force captains and four hundred twenty-six troopers."

"So!" said Bvandt. "So!" He jiggled his extensibles, humped himself and fumed. "So!"

"So what?" inquired Vteish, blundering badly.

That started Bvandt off again. He went a second time through his long list of choice vituperations, this time taking care to emphasize their especial application to supporting officers in general and one dream-play addict named Vteish in particular.

"Yes," agreed Vteish, when he had finished. He looked abashed.

"Now," continued Bvandt, gaining control of himself with an effort, "I have noticed one peculiar feature of the enemy's tactics." He fixed three cold, contemptuous eyes on Vteish while the other five watched the trees. "I do not suppose that you have observed it."

"To what feature do you refer?"

"The enemy keeps to a one-blow technique." Bvandt carried on to explain it further. "There was one blow at our sniper, one at our six

marksmen, one at the gun, one at these ships. Each succeeded because it was perfectly aimed and timed—but each was only one blow devised to suit a specific occasion. They have not yet demonstrated their ability to deliver two blows simultaneously, or three, or six." He stared meaningfully at the other. "Perhaps because they are not able to."

"Ah!" said Vteish.

"Being alien, they have alien minds," Bvandt went on. "It is remotely possible that they lack the ability to concentrate on more than one thing at one time. A confrontation with several simultaneous threats might prove too much for them."

"Might," said Vteish dubiously.

"Do you hold the view that we should withdraw—and accept the consequences back at headquarters?" demanded Bvandt, quick to seize upon his skepticism.

"Oh, no, not at all," Vteish denied hurriedly.

"Then be good enough to display a visible measure of co-operation and enthusiasm. Remember that you are an officer. As such, you must set an inspiring example." He shifted his feet to strike an attitude more important. "As I do!"

"Yes."

"All right! For a start you can supervise the salvaging of the side-guns. Get them out of the ships, attach their ammunition-trailers and position them in a semicircle barely within range of the alien vessel."

"A semicircle?"

"Of course, you idiot! If we place them in a complete circle, we'll have them firing upon each other."

"What," persisted Vteish, "when the alien ship—which is the center of the circle—is barely within range?"

"I take no risk of range estimates and overshooting," Bvandt shouted. "We may have casualties enough." He gave himself time to cool down before he added: "The important thing is to spread the guns immediately they are out, and to keep them spread while making the approach. See that they are hauled to their stands while widely dispersed; they cannot then be put out of action with one selective blow." Glowering at the other, he snapped, "Get going!"

"Very well."

Bvandt turned to Captain Hixl. "You will remain here with the surviving crew. Take your orders from Commander Vteish and see that the crew digs out those guns in double-quick time." Then to Gordd. "You will command the land-force captains and their troops. Deploy them and make careful approach to the alien ship. Keep no closer together than is necessary to maintain contact. Select and guard a semicircle of sites for the guns which Vteish will bring. Hold them until he arrives. Beat off any attacks as best you can, and be careful to watch the trees." He got eight times an eyeful of the nearest tall growths

before he repeated, "Watch the trees!"

"As you order." And with an air of ill-concealed foreboding, Gordd departed with his small army. Bvandt roamed irritably around, watching the trees and ignoring the sky-gaps. Now and again he chivvied the crew as they sweated and strained to get out the guns.

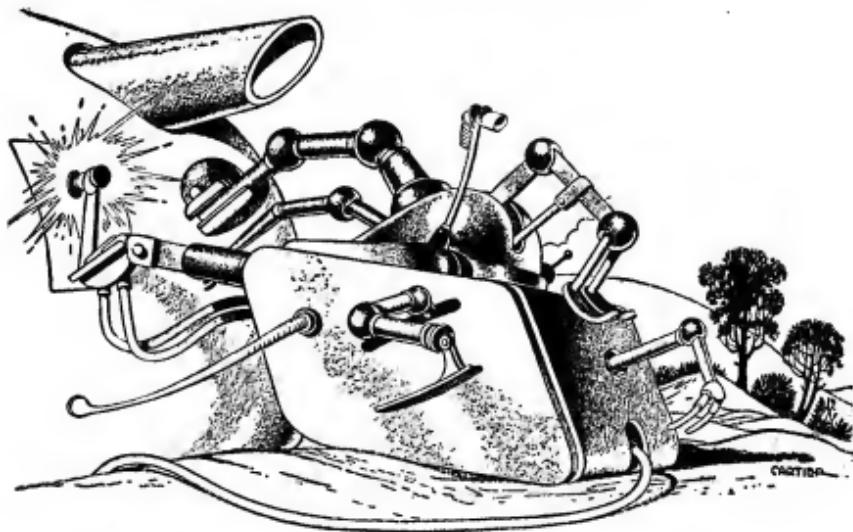
One by one the heavy weapons were extracted, and lugged among the trees. There were twelve altogether. Bvandt would much have preferred to use the still larger and heavier bow-rifles, but these were fixtures impossible to remove without dockyard facilities. He had to be content with the two batteries of mobile side-guns.

The job completed as dusk began to fall. Nothing untoward happened—except the death of Gordd.

A trooper brought the news. Encouraged by the aliens' seeming indifference, Gordd had attempted to get nearer their ship. He had crept cautiously forward, covered by two nervous troopers. He had been attacked in the deep brush by something swift and black and manifestly spawned of a ferocious world. The assailant had made violent, non-speech noises as it took Gordd apart.

"And what of the troopers covering him?" asked Bvandt, stabbing the messenger with his eight-eyed glare. "What did they do—sit around and chew leaves?"

"The black thing darted out too suddenly to permit a shot," explained the trooper. "It was upon Captain Gordd in a flash, became mixed up with him. Before the escort could intervene to separate them, they also were attacked."



"By what?"

"Another and different creature. It had a few points of resemblance to the black one but was not the same. It was more slender, more agile, and yellow-colored with curious markings. Its face was blunter, more terrible. It made no noises, and fought with an awful silence." He permitted himself a reminiscent shudder. "This yellow horror was faster moving than the black one, much faster. Indeed, it made motions so confusingly swift that the escort was ripped to pieces under our very eyes, and even the pictograph operators did not succeed in making a clear record of it."

"These creatures, the black one and the yellow one, did not correspond with other aliens already recorded?"

"No."

"Then that makes *six* types," observed Bvandt. He spoke to Vteish as the latter came up. "We have now discovered two more alien shapes. They've just slaughtered Gordd." He flourished his extensibles irefully. "How many *more* forms do they take? In the name of a thousand blue comets, why can't they make up their minds?"

Vteish pondered it before he suggested: "Might not their kind of life be shapeless?"

"What do you mean by that?"

"Now and again we hatch malformations," Vteish pointed out. "Some examples have been weird in the extreme, so much so that we

have destroyed them on sight. But they were weird only in our estimation, not in their own! If malformations occurred frequently enough, they would become the norm. Infinite variety would be accepted as the natural course of events. The process would be self-sustaining, variations breeding further variations. No parents could forecast the shape and form of their offspring or expect those offspring to resemble themselves."

"*Kaminnif!*" snapped Bvandt. "We have other forms of life on our own worlds, tree lizards and water reptiles and insects. I can stretch my imagination far enough to conceive some nonexistent life-form able to progress through the air without engines, perhaps an ultralight form with tremendously enlarged fins of a fish. But I just cannot accept the notion of different forms mating to produce other and more different forms, haphazardly, without law or order."

"Then how do you explain their great variety?" challenged Vteish. "So far, we have found no two alike."

"There is only one solution—they represent the inhabitants of several worlds. Each shape is the master-type of its own planet."

"If that were true it would mean that we're opposed not by one world but by an empire," protested Vteish.

"Why not? We have an empire. We cover twenty-four worlds. I see no reason why this mob of repulsive *nifts* should be confined to

one. We do not know whether this vessel is small or large by their standards. If small, what do they call a big one? How many more outlandish shapes might be on *that*? How many worlds do they control—a thousand?"

"Not a thousand, surely!" said Vteish, finding this too much.

"We don't know." He slurred again, discontent rivaling anger. "We don't know anything of real importance. We have suffered losses and gained nothing worthy of the sacrifice. What makes their vessels so fast? How far through the cosmos do they spread? What is their power relative to ours? How many other strange entities have they got and what form do they take?" He made a spitting sound. "We are as ignorant as at the start."

"But we'll soon find out," Vteish promised.

"We better had! It will go ill with us if we fail. Are those guns positioned yet?"

"Almost."

"Then why do you hang around here? Go to them. Hustle them along. See that they open fire immediately they're ready. Maintain the bombardment until you are satisfied that the target is grounded forever—but don't wreck it completely. We want to learn things from it, valuable things."

"I will go at once." Suiting the action to the word, Vteish hastened between the trees.

Bvandt stared officiously at the

trooper who had brought the news of Gordd. "Well, have you taken root like a vegetable? Or has someone granted you leave of absence?"

"No." Sullenly the trooper made off in the wake of Vteish.

Already it was dark. A few stars shone in the sky-gaps. The trees rustled in the cool night air. Something floated low over the trees, obscuring the stars in its passage and drifting silently on. It was like a wide-eyed ghost. Bvandt failed to notice it.

Humping across to the least damaged ship, Bvandt squatted within the shelter of its main port and waited for the fireworks. Hixl joined him. Together they brooded and waited—and watched the half-visible trees.

In due time the guns thundered raggedly. The whistle of their shells could be heard through the dark. Nearby trees quivered in response to the bursts. There was a long pause, then a second uproarious barrage. Shells screamed toward their mutual aiming point. The blasts caused a bright crimson flickering in the distance.

With much satisfaction, Bvandt said: "I guess that settles that!"

Hixl said nothing.

The penetrating thought-form of Sammy the Sharpeye came through with, "Their newest stent is to extract their side-shooting mediums and drag 'em into the woods. They don't appear to be bothering with the bow heavies."

"Bringing them thisaways?" Peter asked. He was in the control cabin, rubbing his chin and listening, listening.

"Yes, of course."

"How many?"

"Ten so far. Wait a bit." He was quiet for a while, then said: "Plus two more. That's twelve. We should have mailed them another hoister."

"It's too late now," observed Peter. He grabbed the sides of his pilot-seat and hung on as the whole vessel suddenly floated a few feet upward and came down with a wallop. "Youps!"

"What's that for?" demanded Sammy.

"Results. We soared a yard."

"About time too," contributed Rippy's mind. "I get pretty sick of dumps like—" He broke off for a moment, returned excitedly. "Jeepers! Here's one of them practically crawling into my mouth. There are two more on his tail, holding handguns, and somewhat jumpy. How about it, Kim?"

"I'll take the two," Kim replied.

"Greedy!" defined Rippy. "All right, here goes!"

Both went silent, and Sammy came in again saying, "That pair of landbound lugs get fed too much. They don't know what to do with their surplus zip."

"Boys will be boys," Peter reminded. "What do you see now?"

"The guns have been dragged away, with plenty of ammo. I get occasional glimpses of them through

the trees and they're spread over a couple of miles. The light is getting lousy—reckon it's time Nilda took over."

"Coming right now," Nilda chipped in.

"Three slurpers have lost interest," announced Rippy suddenly. "Pfaugh! What a mess they make." Pause. "Nice work, Kim."

Kim did not reply.

The boat floated again, remained poised ten feet from the ground. A shrill shriek like that of a whirling grinder-wheel came from the rear. It ceased abruptly. Someone started bouncing ball bearings on a pile of empty cans. The vessel remained steady at its new elevation.

"We are now in a state of suspense," Peter informed all and sundry.

"I know it," retorted Hector. "I've four full pans, two double boilers, one percolator and one pressure cooker all waiting for the drop."

The ship promptly dropped, not too hard, but hard enough.

Hector bawled: "There, what did I tellya?"

Leaving the control cabin, Peter went along the passage, had a look in the antigrav chamber. All within was quiet and peaceful. There was no sign of the rhomboidal object.

Hopefully, he tried the fourth cubical along the passage, shoved open its door, had a glance through. Superior life-form number two was standing impassively in a corner, his various limbs folded or retracted,

his air that of one patiently prepared to wait the crack of doom.

"Mechano has finished!" Peter transmitted the news like a mental yelp. He did a little dance. "Back in the ship, all of you. Make it snappy!"

Clobo complained, "Just as I was going out. Oh, well—"

Regaining the control cabin, Peter fastened himself into the pilot-seat, fingered the familiar gadgets, stared anxiously through the armorglass and into the pall of darkness. He was not unduly worried about the hidden guns. He had the choice of six effective methods of dealing with those now that they were no longer shielded over the rise of land, the simplest being to cause a gentle but not soothing vibration in the molecules of their ammunition. The result would be drastic. He could arrange it right now if necessary, but was not sure of the necessity. Peter's tendency was to slaughter only in minimum terms suitable to the circumstances.

At the moment his only anxiety was for the missing members of the crew, and since they were strictly nonmechanical the noisiest *nift* reposed in his cabin and refused to do anything about the woe.

"Rippy in," suddenly reported that worthy.

"Sammy in," followed right after the other.

"They're ranging and aiming the guns but haven't yet loaded," informed Nilda, blandly ignoring the

order to return. "We'll just about make it."

"Kim!" called Peter urgently. Bending forward in his seat, he stared hard into the dark. Nothing could be seen other than a faint haze of starlight over distant trees.

"Coming!" answered a harsh tone presently. Then, half a minute later, "Kim in."

"Now they've loaded!" screeched Nilda from somewhere far off in the gloom. "Take her up! Leave the lock open for me!"

Automatically, Peter shifted the antigrav control. The ship did a sharp, sickening rise to five hundred feet, hung there. An instant later great throbs of fire spurted in a half-circle from the trees. Unseen things whined shrilly through the night. A dozen gouts of crimson sprang from the ground immediately beneath.

"Nilda!"

"Keep your hair on—I'm coming."

He lifted two hundred feet higher, waited, fingers ready at the controls, eyes gazing expectantly through the armorglass. He did not see her approach, but shortly she said: "Nilda in."

More fire spurted below. The closer sound of the missiles and spread of resultant bursts showed that the hidden guns had been elevated. With a brief, "Tsk-tsk!" he gave the antigravs full play. An hour later he cut them off, switched in the rockets. The world shrank behind.

The advance guard of four on-coming alien vessels sighted him half a million miles out, re-angled in pursuit. He did not bother to change course. Shifting the propulsor controls to the end notch, he watched the others gradually slide off his side-screen, reappear on his tail-screen and slowly diminish. By the time they had shrunk to barely discernible dots they had given up and turned back.

Setting a new course, he locked the automatic pilot onto it, checked its operation, unstrapped from his seat, stretched and yawned.

Hector's thought-form complained: "I've told you ten times that chow's ready. Dontcha want any?"

"Yes, sir! Give me a minute."

He watched the autopilot a little while before he left the cabin. There was laughter-impulses coming from the combined galley and messroom toward the tail. It was an easy guess that Clobo was putting on one of his ever-popular acts, probably his famous impression of Fleet Admiral Dickson going pop-eyed over his food. A good guy, Clobo, whose value lay mostly in his ability to entertain, to beat off space-boredom and maintain morale.

The same old wonder came to Peter as he closed the control cabin door, the marvel of a million long, long years, the frequently recurring realization that the hugeness of space is matched by the immensity of time.

For all had passed through the many eons. Some had leaped ahead, some lagged behind. But several of the laggards had put on last-moment spurts—because of late functioning of natural laws—and the impact upon their various kinds of the one kind called Man.

Until they had breasted the tape together.

For the hundredth or two-hundredth time he paused on his way to the galley and studied the inscribed plate set in the wall. It read:

Patrol Boat Letitia Reed.

(Presented to the Associated Species by Waldo Reed).

<i>Crew.</i>	<i>Kind.</i>
Peter the Pilot.	Terraman.
Sammy the Sharp-eye.	White-crested Eagle.
Hector the Hasher.	Venusape.
Rippy the Ranger.	Terradog.
Kim the Killer.	Hunting Cheetah.
Mechano the Mender.	Automaton.
Clobo the Clown.	Spectral Tarsier.
Nilda the Night-watcher.	Great Horned Owl.

Grinning, Peter carefully left his mind wide open while he thought to himself, "Boy, what a bunch of bums we've got!" Then just as carefully he closed his mind while he added, "But I'd sooner lose my legs than any one of 'em!"

"For the eleventh time, you bum—" howled Hector.

"Coming!" He took his eyes off the plate and hurried to chow.

THE END



PRODIGY

BY THEODORE STURGEON

He was a very strange child—and a strange child was something that world couldn't stand. Particularly, that type of strangeness—

Illustrated by Quackenbush

Mayb, Chief Guardian for the Third Sector of the Crèche, writhed in her sleep. She pressed her grizzled head into the mattress, and her face twisted. She was deep in slumber, but slumber could not keep

out the niggling, soundless, insistent pressure that had slipped into her mind. Sleep was as futile a guard as the sheet which she instinctively pulled up about her ears.

“Mayb!”

She rolled over, facing the wall, her mind refusing to distinguish between the sound of her name in the annunciator and this other, silent, imperative thing.

"Mayb!"

She opened her eyes, saw on the wall the ruby radiance from the annunciator light, grunted and sat up, wincing as she recognized consciously both summonses. Swinging her legs out of the bed, she leaned forward and threw the toggle on the annunciator. "Yes. Examiner."

The voice was resonant but plaintive. "Can't you do something with that little br—with that Andi child? I need my sleep."

"I'll see what he wants," she said resignedly, "although I *do* think, Examiner, that these midnight attentions are doing him more harm than good. One simply does not cater to children this way."

"This is not an ordinary child," said the speaker unnecessarily. "And I still need my sleep. Do what you can, Mayb. And thank you." The light went out.

There was a time, thought Mayb grumpily, as she pulled on her robe, when I thought I could shield the little demon. I thought I could do something for him. That was before he began to know his own power.

She let herself out into the hall. "Subtle," she muttered bitterly. Sector One, where children entered the Crèche at the age of nine months, and Sector Two, into which went those who had not fallen by the

wayside in eighteen months of examinations—they were simple. The mutants and the aberrants were easy to detect. The subtlety came in Sector Three, where abnormal metabolisms, undeveloped or non-developing limbs or organs, and high-threshold reactive mentalities were weeded out by the time they got there, and behavior, almost alone, was the key to normalcy.

Mayb loved children, all children—which was one of the most important parts of being a Guardian. When it became necessary for her to recommend a child for Disposal, she sometimes stalled a little, sometimes, after it was done, cried a great deal. But she did it when it had to be done, which was the other part of being a good Guardian. She hadn't been so good with Andi, though. Perhaps the little demon had crawled farther into her affections—at first, anyway—with his unpretty, puckish face and his extraordinary coloring, his toasted-gold hair and the eyes that should have belonged to a true, redhead. She remembered—though at present it was difficult to recall a tenderness—how she had put aside the first suspicions that he was an Irregular, how she had tried to imagine signs that his infuriating demands were temporary, that some normal behavior might emerge to replace the wild talent for nuisance that he possessed.

On the other hand, she thought as she shuffled down the hall, it may seem hard-hearted of me, but things

like this justify the Code of the Norm. Things like this can be remembered when we have to send some completely endearing little moppet into the Quiet Room, to await the soft hiss of gas and the chute to the incinerator.

Mayb reacted violently to the thought, and wondered, shaking, whether she was getting calloused in her old age, whether she was turning a personal resentment on the child because of this personal inconvenience. She shook off the thought, and for a moment tried not to think at all. Then came the shadow of a wish for the early days of the Normalcy program, two centuries before. That must have been wonderful. Normalcy came first. The children went into the crèches for observation, and were normal or were disposed of. Homo superior could wait. It was humanity's only choice; restore itself to what it had been before the Fourth War—a mammal which could predictably breed true—or face a future of battles between mutations which, singly and in groups, would fight holy wars on the basis of "What I am is normal."

And now, though the idea behind the program was still the same, and the organizations of the crèches were still the same, a new idea was gaining weight daily—to examine Irregulars always more meticulously, with a view, perhaps, to letting one live—one which might benefit all of humanity by his very difference; one who might be a

genius, a great artist in some field, or who might have a phenomenal talent for organizing or some form of engineering. It was the thin end of the wedge for Homo superior, who would, by definition, be an Irregular. Irregulars, however, were not necessary Homo superior, and the winnowing process could be most trying. As with Andi, for example.

Holding her breath, she opened the door of his cubicle. As she did so the light came on and the ravening emanation from the child stopped. He rose up from his bed like a little pink seal and knelt, blinking at her, in the middle of the bed.

"Now, what do you want?"

"I want a drink of water and a plastibubble and go swimmin'" said the four-year-old.

"Now Andi," Mayb said, not unkindly, "there's water right here in your room. The plastibubbles have all been put away and it isn't time for swimming. Why can't you be a good boy and sleep like all the other children?"

"I am NOT like the uvver children," he said emphatically. "I want a plastibubble."

Mayb sighed, and pulled out an old, old psychological trick. "Which would you like—a drink of water or a plastibubble?" As she spoke she slid her foot on to the pedal of the drinking fountain in the corner of the tiny room. The water gurgled enticingly. Before he was

well aware of what he was doing, Andi was out of bed and slurping up the water, with the cancellation of his want for the plastibubble taking root in his mind.

"It tas-tuz better when you push the pedal," he said charmingly.

"Well, that's sweet of you, Andi. But did you know I was fast asleep and had to get up and come here to do it?"

"Thass all right," said Andi blandly.

She turned to the door as he climbed back on the bed. "I wanna go swimmin'!"

"No one goes swimming at night!"

"Fishes do."

"You're not a fish."

"Well, ducks, then."

"You're not—" No; this could go on all night. "You go to sleep, young fellow."

"Tell me a story."

"Now Andi, this isn't story-telling time. I told you a story before bedtime."

"You tol' it to everybody. Now tell it to *me*."

"I'm sorry, Andi; this isn't the time," she said firmly. She touched the stud which would switch the light off when she closed the door. "Shut your eyes, now, and have a nice dream. Good night, Andi."

She closed the door, shaking her head and yawning. And instantly that soundless, pressurized command began yammering out, unstoppable, unanswerable. Telepathy

was not a novelty nowadays, with the welter of mutations which had reared their strange, unviable heads since the Fourth War; but this kind of thing was beyond belief. It was unbearable. Mayb could sense the Examiner rearing up on his bed, clapping his hands uselessly over his ears, and swearing volubly. She opened the door. "Andi!"

"Well, tell me a story."

"No, Andi!"

He rolled over with his face to the wall. She could see him tensing his body. At the first wave of fury from him she cried out and struck herself on the temples. "All right, all right! What story do you want to hear?"

"Tell me about the bear and the liger."

She sat down wearily on the bed. He hunkered up with his back to the wall, his strange auburn eyes round and completely, unmercifully, awake.

"Lie down and I'll tell you."

"I do-wanna."

"Andi," she said sternly. For once it worked. He lay down. She covered up his smooth pink body, tucking the sheet-blanket carefully around him in the way she sometimes did for the others at bedtime. It was a deft operation, soothing, suggesting warmth and quiet and, above all, sleep. It did nothing of the kind for Andi.

"Once upon a time there was a bear who was bare because his mother was radioactive," she began, "and one day he was walking along

beside a neon mine, when a liger jumped out. Now a liger is half lion and half tiger. And *he* said,

"Hey, you, bear; you have no hair;

You're not normal; get away there!"

"And the bear said,

"You chase me, liger, at your peril

You're not normal 'cause you're sterile."

"So they began to fight. The liger fought the bear because he thought it was right to be natural-born, even if he couldn't have babies. And the bear fought the liger because he thought it was right to be what he was as long as he could have babies, even if his mother was radioactive. So they fought and they fought until they killed each other dead. And *that* was because they were both wrong.

"And then from out of the rocks around the neon mine came a whole hundred lemmings. And they frisked and played around the dead bear and the dead liger, and they bred, and pretty soon they had their babies, a thousand of them, and they all lived and grew fat. And do you know why?"

"What was they?"

"Lemmings. Well, they—"

"I want some lemonade," said Andi.

Mayb threw up her hands in exasperation. You can cure an Irregular by indoctrination, she thought. She said, "I haven't finished. You see, the lemmings lived because their babies were the

same as *they* were. That's called breeding true. They were Nor—"

"You know what I'd do if I was a bear wivout any hair?" Andi shouted, popping up from under the covers. "I'd rear back at that old liger and I'd say don't touch me, you. I hate you and you can't touch me." A wave of emotion from the child nearly knocked Mayb off the bed. "If you come near me, I'll make your brains FRY!" and with the last syllable he loosed a flood of psychic force that made Mayb grunt as if she had walked into the end of an I-beam in the dark.

Andi lay down again and gave her a sweet smile. "Thass what I'd do," he said gently.

"My!" said Mayb. She rose and backed off from him as if he were loaded with high explosive. The movement was quite involuntary.

"You can go away now," said Andi.

"All right. Good night, Andi."

"You better hurry, you ol' liger, you," he said, raising himself on one elbow.

She hurried. Outside, she leaned against the door jamb, sweating profusely. She waited tensely for some further sign from within the cubicle, and when there was none after ten minutes, she heaved a vast sigh of relief and started back to her bed. This was the third time this week, and the unscheduled night-work made her feel every one of her twenty-eight years of service to the Crèche. Fuming and yawning, she

composed herself for what was left of her night's sleep.

"Mayb!"

She twitched in her sleep. *Not again*, said her subconscious. *Oh, not again. Send him to the Quiet Room and have done with it.* Again she made the futile, unconscious gesture of pulling the covers over her head.

"Mayb! Mayb!"

The annunciator light seemed fainter now, like the slight blush of a pale person. Mayb lowered the covers from her face and looked at the wall, blinked, and sat upright with a squeak. Her eye fell on the clock; she had to look three times to believe what it told her. "Oh no, oh no," she said, and threw the toggle. "Yes Examiner. Oh, I'm so sorry! I overslept, and it's three whole hours. Oh, what shall I do?"

"That part's all right," said the speaker. "I had your gong disconnected. You needed the sleep. But you'd better come to my office. Andi's gone."

"Gone? He can't be gone. He was just about to go to sl—oh. Oh! The door! I was so distraught when I left him; I must have left the door unl . . . oh-h, Examiner, how awful!"

"It isn't good," said the speaker. "Essie took over for you and she's new and doesn't know all the children. So he wasn't missed until the Free Time when Observation 2 missed him. Well, come on in. We'll see what we can do." The

light went out, and the toggle clicked back.

Mayb muttered a little while she dressed. Up the corridor she flew, down a resilient ramp and round to the right, where she burst into the door over which the letters EXAMINER drifted in midair. "Oh dear," she said as she huddled to a stop in the middle of a room which was more lounge than office. "Dear oh dear—"

"Poor Mayb." The Examiner was a beaming, tight-skinned pink man with cotton hair. "You've had the worst of this case all along. Don't blame yourself so!"

"What shall we do?"

"Do you know Andi's mother?"

"Yes. Library-Beth."

"Oh yes," the Examiner nodded. "I was going to look her up and vize her, but I thought perhaps you'd rather."

"Anything, Examiner, anything I can do. Why, that poor little tyke wandering around loose—"

The Examiner laughed shortly. "Think of the poor little people he wanders against. Uh—call her home first."

Mayb went to the corner and wheeled the index to the Library designations, found the number and spoke it into the screen, which lit up. A moment later its blankness dissolved away like windblown fog, to show a young woman's face. She was the true redhead from whom Andi had his eyes, that was certain.

"You remember me," said Mayb.

"Crèche-Mayb; I'm Andi's Sector-Guardian."

"Uh-huh," said the woman, positively.

"Is . . . is Andi there?"

"Uh-uh," said the woman negatively.

"Now Beth—are you sure?"

The woman wet her lips. "Sure I'm sure. Isn't he locked up in your old crèche? What are you trying to do; trick me again into signing that paper to have him put in the Quiet Room?"

"Why, Beth! No one ever tried to trick you! We just sent you a report and our recommendation."

"I know, I know," said the woman sullenly. "And if I sign it you'll put him away, and if I don't sign it you'll appeal and the Examining Board'll back you up. They always do."

"That's because we're very careful, Guardians—"

"Guardians!" snarled Beth. "What kind of Guardians let a four-year-old child wander out of the Crèche?"

"We are not guardians of the children," said Mayb with sudden dignity, "we are Guardians of the Norm."

"Well you'll never get him back!" screamed Beth. "Never, you hear?" The screen went black.

"Is Andi there?" The Examiner's eyes twinkled.

"My goodness," murmured Mayb. "My, my goodness!"

"I wish those pre-disposal examinations had never passed the Board.

If it weren't for them, this would never have happened. Why, ten years ago we'd have quietly put the little fellow out of the way when we found he was an Irregular. Now we have to wait three weeks, and poke and prod and pry to see if the irregularity can possibly turn into a talent. I tell you, it'll break the crèches. The mother of every last freak on earth is going to cry that her little monster is a genius."

"Oh, if only I hadn't been careless with that silly old door!" She wrung her hands.

"Mayb, don't get worked up. It'll be all right. I'm sure it will."

"You're so nice!" Her voice was shockingly loud in the still room. "Oh dear! Suppose that woman really does hide him? I mean, suppose she takes him away? Do you realize what it will be like if that child is allowed to grow up?"

"Now that is a terrifying thought."

"Think of it! He already knows what he can do, and he's only four years old. Think of those radiations of his grown up man-sized! Suppose he suddenly appeared, grown up, in the middle of a city. Why, when he wanted anything, he'd get it. He'd *have* to get it. And he couldn't be stopped! He can't be reached at all when he does that!"

The Examiner took her arm and gently led her to a mirror on the wall. "Look at yourself, Mayb. You know, you don't look at all like the fine, reliable Guardian you are.

Suppose Essie saw you now; you'd never be able to teach her a thing. I'm head of the Crèche. That's a privilege, and there's a certain amount of worrying I have to do to earn it. So let me do the worrying."

"You're so good," she sobbed. "But—I'm *afraid!*"

"I'm afraid, too," he agreed soberly. "It's a bad business. But—don't worry. Tell you what. You just go and lie down for a while. Cry yourself out if you want to—it'll do you good. And then go on with your work." He patted her on the shoulder. "This isn't the *end* of the world."

"It might be," she gasped, "with creatures like that loose in it, forcing and pressing and pushing and not to be stopped until they had what they wanted."

"Go on now."

She went, wringing her hands.

It was almost exactly the same time the next morning when Mayb was summoned from the Assembly Room where she was teaching her children to sing

"There was a young fellow called
Smitti

Who lived in an abnormal city.
His children were bugs
And two-headed slugs,

Oh dear! What a terrible pity!" and in the midst of the children's shrill merriment at Smitti's comic predicament she got the Examiner's call.

The thin veil of laughter fell from her face and she rose. "Free time!" she called. The children took the signal as a permission to play; the



hidden watchers behind one-way glass in Observation 1 and 2 bent toward their panes, Normaley Reaction charts at their elbows.

Mayb hurried to the Examiner's office. She found him alone, rubbing his hands. "Well, Mayb! I knew it would be all right."

"It's about Andi? You've found him? Did you get the police?"

"She got them." He laughed. "She got them, herself. She just couldn't take it—his own mother."

"Where is he?"

"She's bringing him . . . and I'll bet that's her, right now."

The door swung open. An Under-Guardian said, "Library-Beth, Examiner."

Pushing past the underling, Library-Beth entered. Her flaming hair was unkempt; her face was white and her eyes wild. In her arms she carried the limp form of Andi.

"Here he is . . . here . . . *here!* Take him; I can't stand it! I thought I could, but I can't. I didn't know what I was doing. I'm a good citizen; I want to do my duty; I care about the law, and the Norm, and the race. I was crazy, I guess. I had a thing all made up to tell you, about Andi, about him surviving, that was it—he can survive better than anyone else on earth, he can; he can get anything he wants just by wanting it, and no one can say no to him, not so it makes any difference to him." It poured from her in a torrent. She put the limp form down on the settee. "But I

didn't know it was like this. And he badgered me all night and I couldn't sleep, and he ran away in the morning and I couldn't find him, and he hated me and when I saw him and ran to him he hated me with his mind, more and more and more the nearer I got, so that I couldn't touch him, and people gathered round and looked at him as if he was a monster, and he is, and he hated them all, every one of them. And somebody got a policeman and he threw sleep-dust, and Andi made a hate then that made everyone cry out and run away, and he hated everyone until he fell asleep. Now take him. Where is that paper? Where is it?"

"Beth, Beth, don't. Please don't. You'll flurry everyone in the place, and all the children."

"Where's the paper?" she screamed, joltingly. It made Mayb's ears ring.

The Examiner went for the form, handed two copies and a stylus to Beth. She signed them, and then collapsed weeping into a chair.

"M-mayb?" The voice was faint. "He's waking up. Quick, Mayb. Take him to the Quiet Room!"

Mayb scooped up the child and ran, kicking the door open. Two doors down the hall was a cubicle exactly like all the other cubicles, except that it had a black door. And certain concealed equipment. This time she did not forget to press the door until it was locked. Gray with

tension, she went back to the office.
"All right, Examiner."

The Examiner nodded and stepped swiftly to his button-board. He pressed a certain button firmly, and a red light appeared.

"Andi!" Beth moaned.

Mayb went to her and put her arms around her. "There now. It's for the best. This doesn't happen much any more. We used to have to do it all the time. Soon we'll never have to do it again."

The Examiner's expression was bitter, and sad, too. "Minority victims don't give a care for statistics," he thought.

Mayb changed her approach. "Beth, we're getting our norm back. Think—really think what that means. Humans used to live in complete confidence that they would be real, hundred per cent humans, with all the senses and talents and abilities that humans can have. And we're getting that back! It's a pity, a thousand times a pity, but it has to be done like this. There is no other way!"

Her carefully chosen thoughts could not override the mental pressure which began to squeeze at them

from somewhere—from the Quiet Room.

The light on the board turned yellow.

"Andi—"

"And it's a good norm," thought Mayb desperately, "chosen in a congress of the most wonderful, objective minds we have ever had on earth. Why, some of them weren't normal according to the Code they drew up! Think how brave—"

The agonizing, yammering call blared up, dwindled, flickered a moment, surged again and was suddenly gone. Through Mayb's mind trickled the phrase "in at the death." She knew it came from the Examiner, who was standing stiffly, his face registering a harrowing repulsion. He turned abruptly and threw a lever. The incinerator was fed.

"Don't cry. It's better this way," Mayb radiated to the weeping woman. "It's better for him. He never could have been happy, even if men left him alone. Poor, poor unfinished little thing—imagine the life he'd have, always able to speak, never to know when he shouted or screamed, and never being able to hear except with his ears—the only nontelepath in the whole world!"

THE END

* * * * *

COLONIAL

BY CHRISTOPHER YOUD

Human beings are not logical—they're emotional. But they like to believe they're logical—and they tend to think aliens will react logically. Why should they—we don't!

Illustrated by Orban

Old Kajan came up out of the swamp, moisture dripping from him oozyly at every step, and flopped down in his usual seat directly under the battered sign—U N I T E D C H E M I C A L S. Max Larkin watched the deliberate approach through the double windows of his office. He looked round for Renfrew, remembered he was out checking the perimeter fields, cursed softly, and closed the book he had been reading. Just as he did so Old Kajan pulled the bell rope; the sound tinkled reluctantly in the air.

He went outside, gasping a little at the impact of the vicious, soggy heat. His own weakness annoyed him; off and on seventeen years on Venus and he could take less even than Renfrew with his nine-month service. He gritted his teeth, as he had done now for many years.

Physically it might have him beaten but that didn't mean he was going to surrender to it. *Not, he thought, addressing the planet, with a pension less than a year away. There wouldn't be another hot season. This was the last. Four more months of it and then only a cozy tropical winter to endure. And after that—Italy. Blue skies and sunshine to tan his pale flesh, dry up his watery, middle-aged bones.* He sat down in the chair beside Old Kajan almost with satisfaction, despite the sweat now drenching him beneath his loose, flimsy uniform.

He gave the friendly native salute, his mind for the most part perched like a hawk above Castellammare, and the vast sweep of the Bay of Naples. The high plume of Vesuvius, white and cool against the blue—

Old Kajan said: "Greetings, lord. May the spirits of Wind and Water never offend you."

He thought: *Venusian isn't unlike Italian in some ways—the liquidity, perhaps. But Italian is liquid with the swift rush of the Tiber or the Arno. Old Kajan's language is more like the hot mud bubbling up through the swamps.* He said formally:

"What brings you, chief?"

"The matter of Labor, and the rewards of Labor," Old Kajan said with dignity, and for the thousandth time Max peered at him, trying to surprise humor on his wrinkled, scaly face. He shook his head regretfully. If it was there, it was beyond his perception.

Old Kajan went on: "The Hlekun fields are sown. All the sowing is now completed. The lord knows it is our custom to celebrate at this time. Is permission granted?"

It was more than ten years since Max had committed the error of not being explicit in a concession to the natives, but he had a good memory. He said warily:

"How long a festival do the . . . spirits of Wind and Water prescribe?"

"Three days, lord."

"It is granted. On the fourth morning your tribe will begin gathering in the Kharlan fields. It is understood?"

Old Kajan raised his scaly fist in silent avowal. After a pause, he said:

"We have eaten the meats that were given us."

A parachute spider flicked past Max's face, trailing its sticky cable on a breeze that was a whiff from a furnace. He fanned his hand at it convulsively. He said to Old Kajan:

"Well?"

The chief said patiently: "When will there be more, lord?"

Up to a period of six days they could understand and remember; beyond that, for the natives, lay eternity. Max said:

"In twice five days there will be more. You must learn to husband your stores."

Old Kajan obediently bowed his head.

"Yes, lord."

Max stood up. His one thought was to get back into the tolerable heat of the house; to settle down with an iced beer and a plate of salted nuts—but with decorum. Always, for the honor of United Chemicals and the moral good of the natives—always with decorum.

"You have spoken, chief?"

Old Kajan stirred uneasily and in that movement the blessed cool and the waiting beer retreated. There was a brief moment of temptation, an impulse to cut and run, and then Max sat down again.

"What needs saying?" he asked.

"Lord, I am ashamed," Old Kajan said.

Yes, Max thought, yes, you're ashamed, but what does that convey to me? Seventeen years and I still

don't know that you aren't laughing at me half the time. He watched a kangaroo lizard scurry underneath the house, a snake's egg grasped tenaciously in its claws. A fresh rash of sweat broke out along his legs.

"Say on, chief," he said.

Another parachute spider, or perhaps the same one, swung towards them on an eddy of air. Old Kajan grunted politely at him, grabbed it with a lightning movement of his large paw, offered it briefly, and swallowed it.

"Lord," he said, "all Men are wise, with a wisdom beyond our knowledge. That is certain."

Max sweated. *Please*, he thought, *not philosophy again, in the middle of the hot season*. He twitched nervously.

"Say on, chief."

"The wisdom of Men is a deep wisdom, and we ignorant ones cannot know its full extent. For us it is enough that we plant as the lord says, reap as the lord commands, and receive, according to our deserts, the lord's bounty. So I have told my people, and I am chief."

Max said impatiently: "Well?"

"Thus have I spoken," Old Kajan said with dignity, "and the tribe heeded; even the young; even the foolish ones."

Obviously he would make his point in his own time. With resignation, Max said:

"That is good."

"I told them," Old Kajan went



on, "that they must pay no attention to other things. I would interpret the wisdom of Men; it was not suitable that they should listen and pry and seek interpretations of their own. I have failed, lord. The young lord speaks, and the foolish and the young ones imagine they can fathom the mysteries of his thoughts. So now they talk between themselves, declaring such heresies as that none should be master and none servant. Lord—"

Max broke in tensely:

"Chief, what has the young lord been saying?"

"It is reported," Old Kajan said warily, "that the young lord has said that neither he nor you, my lord, are really masters but that you serve a thing which is called a System, and which is bad. Furthermore that the time approaches when the System will be overthrown, making all peoples, Men and Venusians alike, free. That is what is reported and the foolish ones, not perceiving that the young lord speaks in mysteries, are disturbed and made restless by them."

The heat was relentless, but he had to think carefully. *Syndicalism. Why couldn't they develop an efficient screening at Venusburg? Though he was a dark horse all right, in nine months there had been no reason for suspicion.* A new wave of heat brushed like a living organism against his body.

"It will be attended to, chief." He paused. "The foolish ones—will there be trouble?"

"There is one that is a leader, lord."

Max closed his eyes. *Renfrew, he thought, Renfrew my lad, you have something to answer for.*

He said: "Let the tribe attend when one can be recognized at twenty-five yards' distance. The trial will be held."

Old Kajan shivered his assent. *Italy, Max thought. Sorrento, and I'll tell the time by sundials, and forget this crazy business of regulating the hours by the photoelectric ocular propensities of a bunch of overgrown amphibians. What is the twenty-five yard vision at this time of the year, anyway? Four o'clock? Or half-past? He could work it out back in the house.* He got to his feet again, scraping off against the chair leg a couple of ambitious leeches from his sandals.

"With the spirits of Wind and Water," Old Kajan intoned.

They made formal farewells. Then the native turned away, and Max made a dash for the house.

Inside, with salted nuts and iced beer, he felt too worn out to tackle anything immediately. The monthly report was half finished. The log book lay accusingly open at the previous day's date. He closed it, and, leaning back in his chair, flicked the remote control of the television. The familiar features of the Venusburg announcer swam into focus like a reverse Cheshire Cat. First the smile and then the man.

"... bringing you now from

Earth a relay of the United Chemicals feature, *World Magazine*. Stand by for—*World Magazine*."

Max watched it with what interest he could detach from his more physical absorption in the beer. Vaguely he reflected that they were losing their grip. Having rediscovered vertical photography they were busy running it into the ground. Not a solitary thing was shot on the level. The contents were not unusual: Another Progress Report on the Gibraltar Dam; Genetics Division on parade. Why was it graduates looked weedier and more stupid every year? Quaint old ceremonies of Korea. (A bird's-eye view of ornamented heads succeeded by worm's-eye views of grotesquely elongated legs.) An interlude of the usual bunch of cranks and mob-orators in Times Square. Carefully sniped camera shots of placards, banners, distorted faces, a voice roaring briefly: ". . . custodian of the Secret passed down from antiquity. Cleopatra knew it. Napoleon knew it. Hitler knew it. And today I—" Max snickered briefly. The page turned. A beach, sunshine, golden sand, bathing girls. He drank his beer in a gulp. The editor's voice: "And now, Discussions. Your views on world events and the current of world thought. And for our first contribution we take you to an outpost on Venus. From a United Chemicals station in Long Province, a young man, Edgar Renfrew attacks the structure of society."

Max shook his head in bewilderment as, on the screen before him, he saw the room in which he sat duplicated. Duplicated except for the face of his assistant which now moved up in front of the visiphone and began to speak. As usual with items recorded from visiphone there was a waviness in the picture which they had not been able to iron out, but there was no mistaking the voice of Renfrew. In his astonishment it was some time before Max began to take in the words.

" . . . increasingly obvious that the term 'managerial society' is only a synonym for economic slavery. This has been borne out overwhelmingly by my experiences here in Long Province. The natives—aspiring, warm-hearted primitives—are thwarted in every positive effort they make by the dead hand of tyranny. They have no rights—"

It rambled on. Max, recovering, refilled his glass and sat down again. He heard the outer and inner doors open and close but did not move to look round. He gazed morosely at the screen and helped himself to nuts. When the screen faded again Renfrew came up from behind him and switched the set off. Max still did not look up. Over his glasses he could see Renfrew's real face: uncertain, proud, anxious, defiant. He waited for him to speak. At last Renfrew said:

"Spare a nut, cobber?"

Max took a brazil carefully between first finger and thumb, and

flicked it across to Renfrew's waiting hand. He said dryly:

"Didn't think you'd take one from the dead hand of tyranny."

Renfrew laughed uneasily.

"That's not you. That's the big shots. You're just a . . . a tool in their hands."

Max said carefully: "Not a tyrant; just a dupe, eh?" He bisected a nut between his front teeth. "How long have you been preparing these fine ideas, Ed?"

Renfrew said cautiously: "I've been reading a lot since I came here. There are a lot of books— That's the way they suppress truth! It's clever, subtle. They don't ban books; they just condition people into spending all their time gawping at television instead. Show them pictures of the wonders of technocracy; poke fun at cranky individualists. Never let them think seriously about anything. Hide the books away from them—"

"And you found them?" Max said. "Which ones?"

"Mostly mid-Twentieth Century," Renfrew said. "The Interegnum writers. Burnham, Hollis, Hayek. They saw where things were leading. They knew that the managerial society really—"

Max interrupted. "I know. I'm not completely illiterate, Edgar. Maybe the television conditioning didn't work with me either. I was responsible for getting most of those books added to the Venusburg Library, as a matter of fact."

Renfrew said eagerly: "Then

you agree? You realize how corrupt society has become?"

Max filled his glass again. He held it up against the light. A touch of cloudiness. Getting near the bottom of the barrel. He drank. Wiping his lips, he said:

"I realize one thing. Seventeen years ago a statement like yours wouldn't have been admitted anywhere on the television circuits, let alone in a United Chemicals feature. And if, by accident, it had been put on, there would have been a cable here by now dispensing with your services."

Renfrew said offhandedly: "Public opinion forces concessions. They don't like doing it."

"That same public opinion which has been drugged into a stupor by television?"

"They tried," Renfrew said defensively, "but people are waking up."

Max consulted the chart on the wall beside the vision receiver. The left-hand control was fixed on their geographical location. He twisted the other to the Venus date. In the center the hours ran parallel to Venusian distance-vision. Twenty-five yards was near enough to four o'clock. He glanced at his watch.

"Edgar," he said, "in about ten minutes from now you are going to witness an interesting event. I don't think it's ever been televised. The tribes are holding a Court of Discipline outside the house here. We, of course, supply the judge.

I'd give you the job if I could. But it appears that you have been talking in what I can only call an unguarded manner in their presence, and as that talk is directly responsible for the trial that's going to take place it would be as well if you didn't come out. You can get a good enough view from the window."

Renfrew was white.

"You mean . . . some of those poor devils of natives are going to get it in the neck because I've talked with them? You can't do that, Max!"

"Only one," Max said. "Old Kajan is satisfied with one. And, of course, it's not my doing. The trouble with you, Edgar, is that you jump to conclusions." He turned the nuts over, looking for another brazil. "After seventeen years I am beginning to get the glimmerings of Venusian psychology. Only the glimmerings, though. They have a strong sense of discipline."

Renfrew said with a quiet fury: "You can't get out of it like that! It's just a little too convenient to the purposes of United Chemicals that the Venusians should discipline themselves in that way. And accepting an Earthman as judge. Do you expect me to believe that that's a natural habit?"

"Not if it upsets you," Max said pleasantly. He glanced out of the window. "Ah, they're arriving early. Cloud density must be up. Before I depart to my . . . duties, there is a little point in history you

may find instructive. You know the Giant Eagles from the Clarke Range?"

Renfrew said sullenly: "I've seen televiews of them."

"Before we came to the planet the natives used to capture them and hold them in big wicker cages. Treated them very well; good food, even exercise with a good strong rope attached to their legs. Those were our predecessors in the judicial affairs of the natives. They had a beautiful code worked out whereby their gestures and motions were interpreted as acts of law. And the really interesting thing is that there has never been the slightest evidence of the thing being twisted for the benefit of an individual or a group. See Carteret's 'Venusian Customs and Traditions.' There's a copy on my shelf."

Renfrew said: "Well?"

"You'll find nothing like it in human history. We're a corrupt lot, Edgar. But the Venusians really have some faith in abstract justice. Just why they abandoned the eagles in favor of us is a doubtful point. But our function, surely, is to accept the compliment gracefully."

"Abstract justice!" Renfrew said bitterly. "For the benefit of the fat bureaucrats of United Chemicals."

Max clicked the inner door open. He turned, his hand on the clip.

"*World Magazine* won't use this, Edgar. United Chemicals still has some traces of the instinct of self-

preservation. Just in case you thought of sending a picture in."

Renfrew's face showed annoyance and frustration, but there was a thoughtfulness as well that Max found puzzling. He wondered about it as he walked out into the breathless heat.

Trials were infrequent; Max had not attended more than half a dozen in all the time he had been in Long Province. He found the ritual fascinating for the light it shed on the behavior patterns of the Venusians, but he had to admit it was a dim and uncertain light. Throughout the trial the accused was made much of, deferred to, honored even above the judge; and he, entering into the convention, treated his accusers with a fine arrogance. At one point, following a recitation of particularly damning evidence against him, he called peremptorily for moisture, and the proceedings were held up while garlands of thick wet weeds were brought up from the village and draped lovingly about him. He was, Max noticed, one of the mottled Venusians, a sport whose coloring, if the latest crop of offspring were anything to judge by, represented a dominant mutation. The head seemed rather larger than normal, too. Were they more intelligent, brighter? It might be worth checking.

Meanwhile the trial. It ended with Old Kajan making his respectful plea to the judge; traditionally a

discursive and tautological summing-up. Max, bracing himself against the thick fury of heat sweltering down from the dirty white blanket of cloud, reflected that there had probably been logic in such respectful reiteration when the judge was a tethered eagle. But now—a tradition-loving people. He shifted uneasily. At last the chief finished and squatted down. As was expected of him Max weighed the evidence silently for some minutes. Then, to the accompaniment of tumultuous cheering, he declared: "Guilty."

The aftermath was none the less horrible for being expected. The accused, transformed immediately into quivering abjectness, was dragged from his dais, the double gauntlet formed, the pitiful staggering progress begun. Before he reached the first turn the victim was spouting green blood. Max turned away. They would not miss his departure now. He wondered if Renfrew was watching.

He did not go into the office to see. He had seen enough of Renfrew for one day. Instead he made for the bathroom, shivered briefly in a cold tub, dried himself and lay down on his bed with a book. The monthly report could wait. The log book could wait. Outside the light dimmed gradually. Max fell asleep, fell through vast interplanetary gulfs into a Tuscan fairyland of sunset—small hills topped with miniature castles and black avenues of cypress.

Renfrew was quiet at breakfast. He made no mention of the previous day's events and Max did not feel like bringing them up himself. The lesson might have been learned. There would have to be a reminder before he went out into the fields again, of course, but—just in case it produced a scene—it was best to leave that to the last possible moment. And then make it a simple command. No talking to the natives. By Order.

Renfrew raced through his breakfast. He stood up, absently brushing crumbs from the corner of his mouth.

"Want me for half an hour? I'll be in my room—writing a letter."

Max nodded. He finished his own meal at his leisure, tossed the remains into the pulverizer, and settled down with the log book. He hadn't written more than three lines when he was disturbed by the loud urgent buzzing of the visiphone. He took his time about walking across to switch it on. But the expression of bored annoyance left his face when he saw the preamble flashing continuously across the screen.

LARKIN, LONG PROVINCE
—VENUSBURG RELAY FROM
ST. LOUIS—LARKIN FROM
HEAD OFFICE—URGENT URGENT

He flipped over to the full circuit.

"Larkin here. I'll take that call. Ready now."

The screen flashed in some interesting colored kaleidoscopes.

COLONIAL

Then it settled, built up into a face—an angry face. Director Hewison's face.

He said: "Larkin here, sir. On service."

Hewison wasted no time.

"What's happening on your place?"

Max cursed Renfrew silently.

"You mean that contribution to *World Magazine*, sir? He's a bit young. And the editor passed it."

Yes, he added under his breath, *let the editor carry his own cans*. He looked straight ahead. Hewison was a study in exasperation.

"Do I look stupid, Larkin?" Hewison said. "Are you trying to suggest I don't know where to allocate responsibility? I'm not talking about *World Magazine*. I'm talking about Atomics."

Max inhaled deeply.

"Atomics?" he repeated.

Hewison said sarcastically: "Words of one syllable—" He flicked his fingers to the side, catching the attention of an invisible clerk. "Put that Atomics reel on here. Jump to it."

His face faded out almost at once. In its place swam up the face of Leo LeRoy, the symbol and trademark of television's biggest news magazine. Atomics—run by Atomics Incorporated. The news magazine with the eighty-three per cent audience rating. The news magazine whose whisper tilted planets. LeRoy's column, LeRoy's voice, with that harsh, grating

vitality that had changed him from a man into a feature.

" . . . never before televised. The ritual comes down almost unchanged from the times before Clarke's first Venus expedition. Almost unchanged, my friends. But—so the charge runs—changed enough, changed subtly at the whole root of the matter, to aid the Companies in their exploitation of the simple Venusians. For the officials of the Companies are now the judges. They who inspire the trials of those who would rebel against authority are also the ones who condemn them to their punishment. A severe and brutal punishment. Watch, my friends—"

It was all in. Max was forced to see now what yesterday he had avoided. The dreadful recurring gauntlet until at last the shambling figure could no longer be urged forward, and dropped motionless in its oozing blood, to be carried back to the village and left to die or recover as its warring shame and vitality permitted. He knew what had happened. Renfrew had simply coupled an extension lens on the visiphone and shot the whole lot through to Venusburg. But that Atomics should have used it!

Hewison, reappearing abruptly, said:

"Well? Understand now?"

Max said, weakly as he realized: "I don't understand how it got on."

Hewison looked at him shrewdly,

his large popping eyes intent and scrutinizing. Then he turned from the screen to speak to others in the room. Max heard the words, muffled but distinguishable. "Clear out—all of you." Hewison turned back.

"Right," he said. "You're alone? Close circuit. Tune for garble. Seven Three Four."

Obediently Max adjusted the dial to garble and fixed the combination as directed. The screen before him flickered, exploded, disintegrated into a frenzy of rainbow particles. Then it settled down again. Hewison's face again, with the heightened black-and-white effect of the garbled channel; his voice thin and tinny.

Hewison said: "I'm trusting you, Larkin. More than I ought to, perhaps; more than I normally would, certainly. You go out on pension shortly?"

"Ten months' time, sir."

"You know what happens if we hand you a dismissal with disgrace?"

Max took hold of himself, compressed his expression into blankness. He knew. Pauperized at forty; dragging out maturity and old age as a janitor, a machine-tender. But it was ridiculous. They couldn't do that to him.

He said: "I know, sir. But—"

"No buts," Hewison said incisively. "We can do it—you know that. Frankly I should be sorry to be forced into such action, but you are only a little man, Larkin, and

there are big things at stake. Very big things. All this social unrest that's been brewing the past ten years. Doesn't hold on Venus of course, but you must have seen signs on home leaves, even on television. No one could miss them."

Max said: "But *World Magazine* used Renfrew's first . . . indiscretion. And it's a United Chemicals feature. I don't get it."

Hewison was annoyed, but with something bigger than Max, something pressing on him out of the larger bureaucratic world.

"Because we daren't give people the chance to call us reactionary, repressive. That's why. Look. Atomics have planned this thoroughly. They're behind all this upsurge of individualism and rebellion. They're the power behind the Restoration of Capitalism League, the National Sovereignties, the Syndicalists, the Anarchists. They subsidized the Antimachine people."

Max said helplessly: "I still don't understand. How does it help them to disintegrate society. They themselves are the kingpin of the managerial state. You're not suggesting they want to commit suicide?"

Hewison's over-loud voice dropped to a whisper.

"Kingpin. That's the trouble. Everyone knows that Atomics are the biggest fish in the pool. But there are other fish. Ourselves, Hydroponics, Transport & Communications, Genetics Division—and the rest. Well, Atomics are out

to centralize. They're putting the squeeze on. But there's got to be an excuse before they can swallow us whole. A state of emergency to justify the strong-arm measures. Well, that's what they've been leading up to. They think this little business of yours may be the precipitant."

"How?"

Hewison glanced down towards a piece of paper on the desk in front of him.

"Within three hours of the Atomics viewcast there were riotous assemblies in Canberra, Los Angeles, Montevideo, Edinburgh and Moscow—in support of the downtrodden Venusians. A League of Colonial Freedom has already been formed. Every Company with Venusian holdings is faced with a rising wave of hostility, and that means—"

It connected suddenly in Max's mind.

"Every Company except Atomics!" he said.

"Exactly. They are the only ones not represented on the planet. So they couldn't have a better spark to set things off. This is going to be a big thing, Larkin. They've jumped the gun on us. We were getting together, working out our own plans to resist Atomics, re-organize world opinion. We didn't think they would act so soon. And some Companies are Welching on us—throwing in to them. Television Services amongst them. Now you see what's going to happen. The



spotlight's on you. You can expect visitors." He seemed to crumple, suddenly old and defeated. "I don't know what you can do. I don't know what any of us can do. But unless you pull something out of the bag quickly our only hope lies in dismissing you with disgrace—and headlines. And that's a slender hope—a very slender one. If it weren't so slender, you would be

out now. As it is—I'm giving you two days to think of something good. And by good I mean perfect. For forty-eight hours it's your worry. After that—well, you'll still have plenty to worry about but not on the U. C. payroll."

Max said: "And Renfrew?"

Hewison dismissed it with a shrug.

"He's small fry. Do what you

like with him." His round, jowled face softened into something like sympathy. "I'm cutting off, Lar-kin. Forty-eight hours. Good luck."

Max switched off the visiphone. He walked across to his desk and sat down again. Mechanically he began to write up the log.

He had switched the television on just before Renfrew came back into the office. It occurred to him that it would be as well to have some idea of what was going on. Impossible, of course, to get a complete picture since there was still only one relay transmitter at Venusburg, but it could be assumed that the program would reflect the diverse home planet viewcasts more or less with fidelity. Despite Hewison's warnings he was staggered by the scope of what was happening. The whole world, judging by the sneaking television cross-sections, was in a state of uncontrollable, flurrying unrest. Demonstrations, rallies, protests and, shockingly—for the first time in a hundred and fifty years of industrial peace—rumors of strike action. And all leading back to Long Province and this small office in which he now sat. It was a focus, magnetic and irresistible. For years the dormant conscience of the planet had been irritated by well-planned pinpricks. Now a swift jab had wakened it, and it was stretching out, an uncertain giant with somewhere, somehow a vague notion of having been

fooled. Max watched in fascina-
tion. When Renfrew came in he pointed to the shifting screen.

"You started something, Edgar."

The Leisure Center at Toronto. The camera high above a ruffled, asymmetrical rose. Plunging down, and the rose enlarging, breaking up into men and women clustered round a platform. Gay, leisure clothes; flushed, excited faces. A voice shouting: "Tyranny is tyranny wherever it lies. Venusians are men and all men are equal. Our ancestors—"

"Our ancestors!" Max echoed. He laughed.

Renfrew had a look of guilty pride.

"You can't laugh it away, Max. The people are beginning to realize— You know I shot the trial to Atomics?"

Watching the screen, Max nodded.

"Well," Renfrew said, "am I sacked?"

The teleview skipped an ocean, a peninsula, a sea. Rome. The Palazzo Venezia. The Roman mob, in a gigantic, rhythmic undulation across the piazza. Max turned away.

"No. You're not sacked. I am, maybe."

Renfrew's pride became uncertainty.

"You're joking, Max. What's it got to do with you? I'll testify that I did it without your knowledge if that's what they want. How can they blame you?"

Max clipped a cigar.

"Who's concerned with blame? In Long Province this station is United Chemicals, and I am this station. You're not anything. That may not be easy for you to realize, watching the pretty ripples from the brick you've just dropped in the pond, but it's true. I've got forty-eight hours to learn the gentle art of miracle working."

Renfrew said: "But your pension?"

Max shrugged.

Renfrew said in a low voice: "I didn't mean it to happen this way, Max."

Max touched the cigar to the lighter filament.

"I wouldn't worry," he said.

"But it's not right," Renfrew insisted. "I was ready to lose my job."

Max grinned. "That's kid's stuff. Only the Grade A martyrs have the chance to sacrifice other people for their cause, though. Think of the nice aching conscience you'll have to look after for the rest of your life. All for the Cause."

Renfrew's young face puckered; he tightened his lips.

"I'm sorry, Max. But it had to be done. You know it had to be done."

The visiphone, buzzing, interrupted them. Max switched on. The preamble was wavering, unlike the steady Venusburg impulses. The call explained it.

LARKIN, LONG PROVINCE
—SHIP TO PLANET—LARKIN FROM TELEVISION SERVICES—PRESS VISIT—CAN YOU ACCEPT?

He switched to full circuit.

"O.K. We'll accept you. Setting up artificial poles now."

He gestured to Renfrew who was at the main switchboard, and in a few seconds they heard the dull mounting purr of the electromagnets. Max addressed the screen, now blank and empty since spaceship transmitters were not equipped for full visual transmission.

"Getting our signals?"

Wavering words again:

SIGNALS STRONG—THANKS—COMING IN NOW.

Max switched off. With Renfrew he turned to the main windows. Dull metal dipped through the cloud barrier, came to a smooth, automatically piloted rest fifty yards from the station. It was a K-type; one of the luxurious small runabouts reserved for the very big officials.

Max said thoughtfully: "Press?"

Renfrew said wretchedly: "Max. I can't say how sorry I am about what this is doing to you."

The television was still on. "And now an interlude. Tchaikovsky's 'Flower Waltz,' interpreted by Vladimir Susskind. Stay tuned for news flashes." Petals flooded out in one of Susskind's usual trite designs.

Max said: "Switch that off, will you? I don't like Tchaikovsky and

I don't like Susskind and at the moment I just hate television."

He was watching the K ship: The side lock opened. The figure emerging was large, running to fat, and considerably overdressed for Venus. It looked round uncertainly, and moved towards the house.

Renfrew said: "If I could only make you see the size of all this—bigger than individuals."

Max grinned. "Sure. That would be nice, wouldn't it?" He was watching the approaching figure. He whistled. "Well. Look what you've landed, Edgar."

Renfrew said peevishly: "Who?"

Max went to open the doors.

"Don't you recognize him? You've seen him often enough." Hot air flowed in quickly as he opened up. "Come in, Mr. LeRoy. I've seen your picture on the television."

LeRoy, sweating, pulled off a coat and jacket.

"It's hot. Hotter than Venusburg. That's better." The famous melting eyes, seen now at close quarters as wet and shifty, flicked round the room. "You're Renfrew. How do."

Renfrew looked awed.

"Yes, Mr. LeRoy. This is Max Larkin. He runs the station."

LeRoy glanced at him indifferently.

"How do. Now, Renfrew. Where are these lizards—the Venusians?"

Max said softly: "They don't have television. It's a festival.

They stay in the swamp for three days."

LeRoy's gaze was swiftly acute.

"Packed 'em off, eh? That's clever, Mr. Larkin. But you have to be cleverer than that to put one over on the Press. When the public calls the lizards will come out and how, festival or fifty festivals."

"And all for their own good, too," Max said ironically.

LeRoy said calmly: "Let's get some things straight, Mr. Larkin. You're busted. You know that. Just how bad a bust depends on our good will. And mostly on mine. There'll be quite a few more of the boys dropping in here before this thing is through. Treat them nicely, too. But watch out for my toes above all. That's all I've got to tell you, Mr. Larkin."

Max picked up the monthly report.

"My assistant can tell you anything you want to know. I've got some work to do."

LeRoy switched his attention. "Renfrew. That was a nice piece of work on your part. I might be able to get you into Television Services. You're a bright lad."

Renfrew said, bewildered: "That's all right, Mr. LeRoy. I'm very happy here on U.C. work. I only wanted to put things right. The Venusians—"

LeRoy said: "Yes, the lizards. They're slave-driven, terrorized. Tell me about the lizards."

Renfrew said: "Well, not terrorized. They're very placid. They

make a fetish of authority, you know. They don't seem to mind when the authority comes from outside. But it seems wrong somehow."

"Slave-driven," LeRoy repeated. "Terrorized. Conditioned into placidness. It's a story. It will fit. Tell me about them. Everything you know."

Renfrew looked uneasily over to where Max was writing steadily.

"If you'd like to come through into my room—" he suggested.

LeRoy lifted his large, paunching body from the chair he had been sitting in.

"Talk in private?" he said. "That's it. That's what we need, Renfrew. I want all the details before the other buzzards get here. I've got a story to get out." He glanced at Max. "Take it easy, office boy. Come on, Renfrew."

They went, leaving silence. *He's a swine*, Max thought, *but a tough swine*. *That little exhibition of mine wasn't very clever*. Not that it mattered, though. It was pretty clear the way things were going. LeRoy wouldn't have come down himself if it wasn't meant to be a really big story. Atomics had the other Companies where they wanted them all right. Everything that in the past had been played down as Trusteeship of Primitives was now going to be spotlighted as Vicious Colonial Exploitation. And the dismissal with disgrace of Max Larkin, while inevitable, wasn't

really going to make any difference.

It wasn't the first time a few men had aimed to control the planet. He remembered the various corporate dictatorships of the first half of the Twentieth Century. But there had been barriers then which no longer existed; sprawling empires and the passions of national patriotism. He realized with a shock that Atomics could do it. Were doing it in fact.

What about the individual then? At present the conflicting stresses of the giant Companies permitted a certain amount of freedom and diversity. What Genetics put under taboo Hydroponics blazoned abroad. It wasn't perfect, but it was something. What happened when that fortunate division of interest became a world-wide, system-wide, hegemony? It was possible to imagine.

Max shook himself wryly. Heroics, he reflected. Your own private world crashing round your ears and you take time to weep for universal liberty.

He remembered Siena. Dusk streaking across the Piazza del Campo; the smell of roasting chestnuts. Montepulciano, high among the Chianti hills where they made the only wine worth drinking. Poggibonsi—the road winding over the hills to Florence. Tuscany, that never would escape from the Fifteenth Century. There was no sound from the adjoining room where Leo LeRoy was pumping Renfrew for his copy. He stiffened in determination. He wasn't beaten

yet. There was a way of getting past LeRoy and all the other jackals of the television circuits. It was a long chance, but any chance was worth trying. He tapped out a preamble, fixed it in the visiphone, put it on call.

While the call went out he ran things over in his mind. It was a pity he knew so little about the psychology of the natives, but at least the others knew even less. The one sure thing was their veneration of abstract justice. They had preferred the enigmatic eagles to the creation of judges from amongst themselves. The eagles, to be captured only with great difficulty and danger on the highest slopes of the Clarke Range. And then, from another planet—he wondered where the Venusians really thought Earth was—had come stranger, remoter creatures. Men. And the eagles were usurped.

The visiphone buzzed.

He said: "That the Venusburg Library? Put me through to Interplanetary History, will you?"

It was a girl, young, efficient-looking.

He said: "Can you do something for me? Can you read me a section from one of your books. I think I know the references."

She said: "Can't we send it to you?"

"No time," Max replied. "Urgent. U.C. business."

"What's the book?"

"Memoirs of Interplanetary

Voyages"—Dr. A. C. Clarke. Book III."

She wasted little time in bringing it.

Max said: "Flip the pages over close to the screen. Chapter Eight, I think. Back a bit. Yes, there. Read from the top of the page."

The girl began to read.

"An interesting, but puzzling, feature of the Venusians concerns their treatment of the Giant Eagles which until the coming of Earth-men had been honored in a peculiar, semireligious fashion. These creatures—"

Max listened intently as she continued. It might work. It must work.

LeRoy had beaten the pack by nearly five hours. They began dropping in during the afternoon and by dusk there wasn't a room that lacked its complement of drawling, cynical voices. Matthews of the *Times*, Yan Sen of the *Eastern Sun*, Lydia Parova of *Planet*, and half a dozen others. There was no hope of getting near the visiphone. They scrambled round it, fuming and cursing and queuing to get their preliminary stories back. Leo LeRoy stood aloof behind his contemptuous, merciless grin.

"You kids amuse me," he said. "You really do."

Matthews said: "All right, big shot. You got here first. You've slipped up, though. Not a single shot of the lizards. Me, I'm going out right now to take their pretty

pictures. Especially that kiddy that took the beating yesterday. What a beauty."

LeRoy said: "Take it easy." He raised his voice, addressing the room in general. "This is one time that I feel a little co-operation wouldn't be out of place. No, listen to me. I had a good start on you if I'd wanted it. But we want to get this thing over properly. No conflicting impressions; everything clear-cut."

Yan Sen said: "You suggest?"

LeRoy looked out at the soggy, darkening landscape.

"Leave it till tomorrow, for one thing. This has got to be perfect. Now look. Tomorrow we'll root the lizards out; organize things properly. I brought some stuff with me. Jack boots and a nice big stockwhip. We'll put over a scene that makes medieval torture look like a Sunday afternoon picnic." The wet restless eyes glanced over to where Renfrew was sitting miserably by himself. "You, kid. How'd you like to be an actor? The big, bold villain? Don't worry—it carries a payroll."

Renfrew said in bewilderment: "But you can't mean . . . faking things. Anyway, it's a festival. They don't work in the fields while a festival is on."

LeRoy clicked his teeth with amusement.

"It's all for their own good, isn't it? They've got tough hides. A few lashes won't hurt them."

Matthews intervened uncertainly:

"This festival business. Is it religious? Mightn't they turn nasty at being dragged out from it? We don't want to risk that."

Renfrew said: "No. There's no chance of that. They're very docile, you know. There's never been a case of them turning on men, no matter what the provocation."

"Right!" LeRoy said. "Well, kid, the job's yours. How about it?"

Renfrew said: "You must be mad. I don't understand."

LeRoy said patiently: "I'm offering you the chance to play Sir Jasper. No identifiable shots, of course. Distance-takes with a few anonymous close-ups."

Renfrew looked at them with sudden, searing anger.

"And if I report this to the Authorities?"

LeRoy said: "It won't get on to television. Why not write a book about it? Come on, Renfrew. Have some sense. We'll look after you."

"You swines!" Renfrew choked. "To think I started this—"

LeRoy stared at him glassily for a moment. Then, with a shrug, he withdrew his attention.

"All right, then. So we draw lots for Sir Jasper. Lydia, got your dice with you? Let's roll for it. Then we'll work out our little play." He lowered his voice in incongruous reverence. "This story is going to be *big*."

During the night there was no noise except for the occasional

splash and gurgle of the swamp waters. The dawn came quietly, too, the drab, unemphatic Venusian dawn filtering its light and incipient heat through the thick, cotton-wool reef of clouds. The village was visible now, the rough stilted shelters standing up crudely from the low tangle of mud and bushes and oily water. As was usual the village was constructed in a rough square about an empty space perhaps thirty feet across. But now, as the gathering light revealed, the square was not empty. In the middle floated a raft, and on the raft rested a square metal box.

The filtered sunlight brightened. A swamp-pig howled its recognition of the new day. Suddenly noises began to emerge from the metal box; recognizable words in the Venusian dialect. A message.

I AM THE LAW. FIRST THERE WERE THE EAGLES. THEY WERE THE LAW AND THE LAW LACKED STRENGTH AND ABSTRACTION. THEN CAME THE MEN FROM BEYOND THE CLOUDS AND THE LAW WAS STRONGER BUT STILL IMPERFECT. NOW I COME, FROM BEYOND SWAMP AND CLOUD AND MOUNTAIN, FROM BEYOND THE FAR REACHES OF THE UNIVERSE, AND THE LAW IS FULFILLED AT LAST. JUSTICE IS ABSOLUTE. I AM THE LAW.

There was a pause. The village

still slept. The message began again. Halfway through a figure appeared in front of one of the huts, listened carefully, and splashed across to the raft. The message ended, and there was a pause, and the message began again. Other figures followed.

By the time the light was fifteen yards all the village was out in the square patch of water, listening to the message of the box.

Renfrew said: "I was wrong. I see that now. I must have been a fool. And all I've succeeded in doing is provide a feast for those scavengers and ruin your hopes of retirement. I feel rotten about it, Max."

Max was shaving and looking out of the window.

"They're about early," he said. "The scavengers, that is. They intend to make a feature film of it if their equipment's anything to go by."

Renfrew said: "I wish you would slam me, Max."

Max said thoughtfully: "They've not asked for the visiphone so they can't be doing a direct relay. They must be canning it, and rushing it back to Venusburg. Nothing less than hundred per cent definition for Leo LeRoy."

A little hysterically, Renfrew said:

"And these poor devils of natives are going to be whipped and knocked about for the amusement of television audiences back on

Earth. I'm responsible for it all."

Max finished shaving, and switched the razor off.

"I hope the timing works out. That's the ticklish part."

"What can I do?" Renfrew asked. "I'm resigning with you, of course, Max. I don't mind machine-tending. But how can I make up for what I've done?"

Max looked at him and grinned.

"Do you really want to help? To save the economic stability of the Solar System and my pension?"

Renfrew said: "Don't joke about it. I wish there was something I could do. I'd do anything."

Max gripped his shoulder.

"Don't worry. You can do something. I'm not kidding. First, get that extension lens you used to shoot the story to Atomics and couple it on to the visiphone again. Go ahead. Jump to it."

The various fliers and K ships that had brought the Press men in to Long Province were huddled together on the upward slope of the ground behind the station. A small procession began to make its way down from them, passing the station at a distance of less than ten yards and continuing on to where the ground dropped abruptly to the swamp and the village. Matthews, Max noted, had been given the acting part; they had dressed him in the Venusian uniform of the U.C. official with the picturesque addition of shining black jack boots and a pearl-handled revolver. He was

carrying a rawhide whip. The rest, except LeRoy himself, were loaded with various cameras and other equipment. LeRoy walked a little apart.

They were visible for about a hundred yards before they disappeared down the slope. Renfrew, coming back to report that the extension lens was fixed, saw their heads bobbing briefly against the white horizon. He cursed violently.

Max looked at his watch.

"Five minutes to the village. Two minutes to get back. If they get back."

Renfrew said: "What is it, Max? What are you trying to do? You don't imagine they will provoke the natives to violence?"

Max laughed. "I'll tell you later."

The minutes passed slowly. Max looked at his watch again.

"Open the window, Ed."

The stifling humid air rolled in from the outside, permeating the hermetically sealed room in a few seconds. Max walked across to the rack and pulled down a Klaberg rifle. He leaned against the window, fondling it.

He said: "Get Venusburg, Ed. Tell them you are speaking for LeRoy. Direct action relay through to Earth. All circuits. They'll use it. They won't dare not to."

A minute later Renfrew said:

"O.K. Accepted. I hope this turns out right, Max."

Max said: "We'll soon know.

Operate that lens as you've never done before. As much telephoto as possible. We want close-ups."

The sounds came first; a confused medley of shouting. There was fear and dismay in it, and pursuing anger. Renfrew switched on without being told. The sounds were nearer. Suddenly the horizon erupted into scrambling, fleeing figures, with other figures, moving in the swift shambling motion of the amphibians, following and overhauling them. Renfrew was operating the lens with tight-lipped smoothness. One of the Press men turned,

firing viciously into the unflinching array of pursuing natives. Two dropped. The rest reached him, and the details of his singularly horrible death flashed out across millions of miles of space to millions of television receivers. The woman, Lydia Parova, stumbled and fell. Renfrew turned white but did not check in his task.

They could recognize each of the pursued now, and some of the Venusians. Renfrew breathed: "Old Kajan!" in a tone of incredulity.

"Where?" Max asked tensely.



"On the left—carrying something. They're getting close!"

Max leaned over the sill, sighting carefully along the Klaberg. He fired, his tongue pressing against one corner of his mouth. And the small box exploded in Old Kajan's face, exploded on the word JUSTICE.

The change was miraculous.

Max shouted: "Cut. Switch off."

Outside the Venusians were halted, bewildered and irresolute, about their chief. The Press men who had escaped were banging on the door of the station for admission.

Max said wearily: "Let them in, Ed."

As he closed the window he saw Old Kajan stagger to his feet and, a moment later, turn with his crest-fallen tribe back towards the swamp.

Renfrew said: "If they hadn't brought the box up with them?"

Max said: "I was pretty sure they would. When a race has been hunting for something since time immemorial they don't like letting it out of their sight when they think they've found it."

Renfrew was silent a moment. Then he said:

"But if you hadn't managed to hit it?"

Max shrugged.

"We might have held out for ten minutes. But I doubt it. They would have had the roof off in less

time than that. They are very sincere people."

He laughed. "Now go and speed our parting guests, Ed. I have a report to make."

Hewison's face on the screen was awed.

"What happened?"

Max said: "The situation, as I saw it, was that Atomics were utilizing fundamentally good mass-emotions—pity and sympathy—as a lever to turn things their way. And mass-emotions don't respond to reasoned arguments. They don't touch them. They wouldn't have been mollified by having my carcass thrown to them, either, though that's beside the point. The only hope was a severe psychological shock playing on fundamentally bad mass-emotions—fear, hatred, resentment, parochialism. Atomics, through LeRoy, planned to drive their advantage right home by portraying U.C. officials as inhuman slave-drivers. Somehow I had to substitute for that an impression of the Venusians as inhuman, ravaging monsters. The natives had to revolt."

Hewison's eyes popped more blankly than ever.

"I still don't get it. In the whole administration there's never been a case of even the mildest rebellion from them. They are like sheep. How could they have revolted?"

"It was tough," Max confessed. "We know so little of the way they think. But we do know one thing—

their passion for abstract justice. It's the really big thing in their lives. All their religious feeling is centered on it." He shook his head slowly. "There's a queer story about the early days of colonization. About the Giant Eagles."

Hewison brushed it to one side.

"I know about that. They used 'em for judges; practically worshiped them. Then when we popped up they transferred to us. Simple enough."

"But it's not the whole story," Max said. "Do you know what happened to the eagles?"

"Turned 'em loose?" Hewison suggested.

"No," Max said, "they didn't do that. They slaughtered them. Tore them to pieces in fact. It's mentioned in Clarke; in Temple, too, I believe."

"Why?" asked Hewison.

"That was the key to the problem," Max pointed out. "But to me it seemed to connect up with the old ritual murders of primitive Earth religions. You know that tag?

'The priest who was the slayer
And will himself be slain.'

Justice with them had to be perfect, you see. First they had the eagles, the most impressive and aloof form of life they knew on the planet. Then we came, more impressive, more aloof, much more satisfactory as priests altogether. And the eagles, rather horribly, went the way

of all flesh. That's how I figured it anyway."

He paused thoughtfully.

"So I rigged up a voice reproducer in a beautifully abstract box. I gave it some grandiloquent lines to say and fixed it during the night where they would be sure to find it next morning. There was man's successor, the new priest, and if my view of their psychology was correct, from that moment a human being was a trigger waiting to go off. Nearly a dozen triggers went down to the swamp."

Hewison shuddered. "I didn't think any death could be nasty enough for LeRoy, but—" He whistled. "But what now, Larkin? Have we got a planetary revolt on our hands?"

"I hit the box dead center," Max said happily. "Not bad for a worn-out colonial official. No. We're all right now. If the eagles had made a come-back against us, they would have been all right too. Justice, for the Vennians, has got to be triumphant as well as abstract. What about your end?"

"Checking reports now," Hewison said. "But it's certainly all right. The League of Colonial Freedom has disappeared without trace. We've won." He paused. "Larkin."

"Sir?" Max said.

"You can catch the next A ship back. Buy yourself a palace in England. You're on a permanent, unlimited expense account for life."

Sunshine. Olives tossing their leaves in green and silver gray.

Peaches and passion fruit eaten from the trees. The cool nights of star-studded velvet above the Venusian canals. He glanced out of the window. Old Kajan was coming up, leaving a wet trail behind him.

"That's very kind of you, sir. But—I'd like to stay on awhile. There are some things here I want to get straight—"

Hewison grinned. "Leave when you like. It's all yours."

Max switched off. Yes, he told himself, it's all yours. But you don't want it. He walked to the door, light-hearted like a kid.

The heat was violent. Old Kajan squatted down comfortably.

"Lord," he said, "I am very ashamed—"

THE END

IN TIMES TO COME

Of course, it is our intent that every issue of *Astounding Science Fiction* shall be good—but I think that next month's issue is going to be a bit better than most. There are several intriguing yarns scheduled—some of which I won't mention, simply because they may be delayed till the issue after next, and I don't want to make false promises.

But "Needle" will be in there. Hal Clement has a two-part serial concerning a detective and a fugitive criminal. The action is here on Earth—modern times—but the criminal and his pursuer are from a galactic civilization, and they constitute the most unusual pair even science-fiction has encountered. It's really an unusual story; the detective is a highly evolved, symbiotic virus!

And Isaac Asimov is back with a story called "Mother Earth." Nope—not a Foundation series story; he's working on one, though. It's to be called "... And Now You don't!", by the way! But "Mother Earth" has the look of a new series under weigh—

But several new authors, with very original ideas are coming up in May . . . or June!

THE EDITOR.

SEETEE SHOCK

BY WILL STEWART

Concluding a tale of strangely mixed loyalties, of men pulled three ways by opposing motives—and the deadly threat of seetee—contraterrene matter that must be used, either as a weapon or a power for good—

Illustrated by Orban

Synopsis:

Nick Jenkins, spatial engineer, was out in space on the seetee bull—a fission-powered machine designed to prospect and mine the untouchable contraterrene meteor-drift—when the photophone beacon on Freedonia went out, leaving him lost in a deadly swarm of seetee fragments.

Cosmic debris of the seetee Invader which collided, ages ago, with the trans-Martian terrene planet Adonis, the contraterrene drift is matter inside out, with negative nuclei and orbital positrons. Unlike charges cancel out when it touches ordinary terrene matter, releasing a thousand times the energy of atomic fission.

The power laboratory on the airless asteroid Freedonia was first

established by the old asterite engineer, Jim Drake, to tame the unimaginable violence of that reaction, for useful power. Drake was bankrupt and in legal difficulties, however, when Martin Brand founded the great Seetee Corporation, to finance him.

Now a successful expert at what he calls politico-financial engineering, Brand—the uncle of Jenkins—is also a gifted spatial engineer. His first great invention was the Brand transmitter, which could broadcast unlimited free power from the seetee generator on Freedonia to all the planets.

But that mighty power plant on Freedonia is still unfinished—and Martin Brand's old, idealistic dream of a Fifth Freedom of power has become a pawn of interplanetary jealousies, will Brand himself

turned cynical toward it by the bitterness of his early defeats.

The four major planets are waging a cautious cold war for supremacy. The vast arena of their struggle is the High Space Mandate, a political device set up after the Spatial War to rule the asteroids and referee the division of the old terrene power metals, uranium and thorium.

All the planets fear the impact of seetee power, as an overwhelming threat to the status quo. The notion of the Fifth Freedom appears disturbingly radical. All, however, are engaged in a desperate race to turn uneasy stalemate into decisive victory with the first use of seetee weapons.

Martin Brand had persuaded Drake to develop self-guided missiles with seetee war heads, to protect the precious installations on Freedonia from attack by the major planets. Lazarene, an able Earth-born engineer, was in charge of the secret arsenal.

Lost when the beacon went out, Nick Jenkins groped his way out of the swarm of untouchable meteors and back to the plant on Freedonia. Landing the bull, he found all the staff of engineers, except one man, fallen mysteriously unconscious, and the seetee arsenal looted.

The missing man was Jean Lazarene, who has apparently betrayed the priceless secrets of Freedonia to agents of one of the intriguing rival planets. The drug ametine hydrate, developed to slow

the metabolism of space-disaster victims, was used to overcome the loyal engineers. The traitor escaped in an unidentified craft, which fired a seetee shot at the rock to stop pursuit.

While that superatomic explosion did little visible damage to the iron planetoid, the multibillion-electron-volt photons released caused intense secondary radiations, which reached Jenkins and all the unconscious men. Deadly radioactive isotopes were also formed in the rock itself.

Bringing the disabled men to the radiation clinic on the asteroid Obania, Jenkins learned from the specialist, Worriinger, that all had suffered radiation burns of the fifth degree—which means death after eight to twelve days.

Jenkins alone was offered a slender chance at life, if he would stay at the clinic for treatment. He declined, however—deciding to use his few remaining days of activity for a desperate effort to complete the transmitter, before the planets are plunged into spatial war.

The creative power of seetee—the Fifth Freedom—offers, he feels, the only hope of peace. Free power from Freedonia, he hopes, can remove the causes of the impending conflict.

Leaving his fellow engineers deep in the coma of ametine and dying of radiation sickness, Jenkins went on to Pallasport, capital of the Mandate and home office of Seetee, to get the condulloy he needs to complete the transmitter.



Martin Brand has already purchased hundreds of tons of that costly superconductor—and hidden it in a vault under his princely estate, Terran Tor. In a painful interview, Jenkins discovers that his once-idealistic uncle has become a ruthless predator, who has been operating Seetee as a monstrous swindle.

While the few remaining days of Jenkins slip away, spatial war breaks out. An unidentified force fires sectee missiles at installations of the High Space Guard. As panic grips the Mandate, Jenkins and his uncle are both arrested—for the Mandate government suspects that

the missiles came from Freedonia.

Jenkins fails in an effort to identify the attacking power—for each of the rival plancs attempts to employ him to manufacture sectee weapons to use against the attacker, and thus each seems to be eliminated.

Martin Brand is quickly freed, through the efforts of his shrewd little lawyer, Adam Gast. But Jenkins stays in jail, in the midst of the war, until an enigmatic girl from Earth arranges his bail and spirits him hastily away from the government buildings in a car.

The girl is Jane Hardin, whom he had met when he first came to space,

on the liner from Panama City. Attracted by her, he yet mistrusts her motives because she has been employed by his uncle. She offers now, with an apparent brave generosity, to help him complete the Brand transmitter.

"Drive on, Mr. Jenkins," she urges him. "We've got a war to stop."

PART 3

XV

Half savage sunlight on knife-edged crags and half midnight shadow, the cruel face of Pallas seemed to tip against them as Jenkins drove up the twisting road from the terraformed hill, until the upended landscape became a forbidding barrier ahead.

That narrow, giddy road was deserted now, but a uniformed guard stopped them at the edge of the emergency field. Jenkins showed the gray passes, and bleak hostility thawed to reluctant respect.

"Right, sir," the sentry said. "Drive on."

They parked outside the walled safety-well where Jenkins had left the ray-poisoned tug. He sat a moment in the car, frowning doubtfully at the lean-cheeked loveliness of Jane Hardin. His jaw set hard, as he held her:

"I want to show you something."

Inside the crooked alley of the radiation trap, he caught her arm to stop her, nodding grimly at the sign posted at the air lock of the rusty, square-hulled *Good-by Jane*.

CONTAMINATED CRAFT

Dangerous Radiations
Don't Approach!

"See that?" He studied her taut face.

Whatever her game was, he thought warily, this ought to show it up. Whatever she wanted, it wouldn't be death. Even if the geigers didn't show a deadly degree of residual activity, she wouldn't want her bright hair falling out or horny blemishes growing on her fine skin. She must hope to have children, sometime, and she wouldn't want them monsters.

"I see."

She didn't even pause to glance at the little geiger, on her wrist, whose irregular flashes became a greenish flicker as she moved on toward the isotope-poisoned metal of the ship.

"I see it, Nick," she whispered, "but we're going to start the Brand transmitter."

Her lips were pale and quivering, her eyes violet with dread. She understood the sign. But she caught his arm, with a wan comradely smile, and came on toward the valves. If she were really playing any secret game, it must be more important than her life.

The battered tug dropped them, ten minutes later, toward the costly lawns and splendid roofs of Terran Tor, a glow of green and a golden glint on the rounded summit of a stark black mountain. Sitting at the hooded periscope in the pilothouse, Jenkins saw the gleam of a tall

silver needle beside the mansion on the Tor. His breath caught sharply.

"What's wrong, Nick?"

"I see the *Adonis*."

"So your uncle is on hand, to guard his stolen condulloy." She nodded soberly. "And his asterite followers are loyal, Nick," she warned. "Don Martin is the beloved patron of little Nuevo Jalisco, and those simple men would all die for him." A note of challenge entered her voice. "How do you mean to take that treasure?"

"I don't know." Jenkins thrust his face back to the hooded lenses, busy landing the craft. "I was just wondering," he added softly, "how my uncle would do it."

He set the awkward-seeming little vessel down on the narrow field that topped the Tor, opened the lock, and presently descended the rusty accommodation steps. He walked very carefully, holding in one hand a small cylinder of white aluminum.

Before him, the Tor seemed a secluded haven of luxurious peace. The convex lawns were a tender green, and the low sun made glittering rainbows in sprays of priceless water. The purple walls had an opulent glitter, and the golden roofs were splendid against the violet spatial dark.

But the terraformed hill was a well-manned fortress. Waiting under the tug, gripping that bright cylinder with both careful hands, he found the mound of yellow roses

which almost concealed a concrete gun turret. He saw the automatic rifle in the arms of the sentry pacing beside the tall *Adonis*. He discovered other black muzzles jutting from under the golden eaves.

"Nicky!"

Martin Brand called to him genially, striding out of the mansion. "So Adam Gast did get you out—"

"No." Jenkins waited close to the meteor-scarred hull, holding the little cylinder. "He didn't."

"Anyhow, it's quite a relief to see you safe, Nicky." Brand came up smiling, mopping at his ruddy, raw-boned face with a huge purple handkerchief. "It has been a ghastly day. Seetee Common dropped eighty-six points before the market closed, in spite of every trick in the book, and those asterite mobs broke half the windows in our building."

He offered a hard, sweaty hand.

"And I was worried about you, Nicky." His voice was husky with concern. "Those mobs would have killed you in a second, and Adam said you'd be safer in jail." His gray eyes widened. "Nicky—what's wrong?"

For Jenkins had ignored the offered hand. He stepped quickly back against the rusty springs and struts and hydraulic cylinders of the tug's ground gear, carefully holding that small bright container. Brand peered at it sharply, rasping:

"What is that?"

"This is the reason you are going to return eighty tons of condulloy

you bought for the Freedonia plant," Jenkins told him quietly. "I want that metal, to finish the Brand transmitter."

Martin Brand stepped back slightly, with a startled toss of his long dark hair. His angular, ruddy face was a study in outraged honor.

"Nicky!" he gasped. "Are you insane?"

Jenkins shook his head.

"I'm probably the sanest man in Mandate," he insisted softly. "I'm going to start that transmitter, and end this seetee war."

"Then you are crazy!"

"Have your men haul out that paragravity loading tube," Jenkins told him grimly. "I want the ingots stacked in the lower hold. The tug's contaminated, but I think a short exposure won't hurt them much. Warn them to keep off the upper decks."

Brand stood frowning, with an air of puzzled indignation.

"Nicky," he began severely, "if this is your idea of a practical joke—"

"It isn't."

Incredulous anger flushed Brand's rugged face.

"Then tell me why I should make you a gift of metal worth three hundred millions—"

"Not quite that."

"Panic buying sent condulloy up today," Brand said sharply. "It closed above four millions a ton—people want portable wealth. Why should I give you—?"

"That metal belongs to the Free-

donia plant," Jenkins said. "And here's why you'll give it back."

Carefully, he lifted and turned the small aluminum cylinder.

"What is that?" Brand snorted. "A can of tomatoes?"

"Don't jar it," Jenkins warned him. "It's an ordinary aluminum can, evacuated and sealed. But the contents aren't tomatoes."

He heard the sharp catch of Brand's breath.

"A simple device." He turned it carefully, for Brand to see. "Being an engineer, you can understand that it's a vast improvement over the old fission bombs."

"Huh?"

"The can is lined with a heavy capsule of terrene iron," he explained. "Inside the capsule is a half kilogram bar of native contraterrene nickel-iron."

Watching the bland, ruddy mask of his uncle's rawboned face, Jenkins saw it tighten.

"Don't make me drop it," he whispered softly. "The two elements are kept from contact only by a very weak surface field of permanent negative paragravity, inside the capsule. A very slight impact would be enough to drive the capsule against the seetee bar."

He gave Brand a bleak little smile.

"So, you see, this small device is just about the equivalent of a one-ton plutonium bomb," he added quietly. "It wouldn't leave very much of the Tor." He drew a long

breath. "Your men can drag out that loading tube, right away."

Brand shook his lean, distinguished-looking head, smiling regretfully.

"I'm disappointed in you, Nicky." His suave voice turned eloquently scornful. "I've been wondering when you would turn your considerable engineering abilities to some goal more practical than my old chimera of the Fifth Freedom, but I was hardly prepared for this sudden change of character—from idealist to pirate!"

"Don't talk so much," Jenkins told him. "Just get that metal loaded."

"Really, Nicky!" Brand smiled reprovingly. "Perhaps I can't condemn your morals, but I should have hoped for more finesse in a kinsman—"

Jenkins wet his lips, peering hard at Brand.

"Do you want me to drop the bomb?"

"You won't drop it, Nicky—not if it actually contains seetee." Brand's deep voice was almost jovial. "An ingenious invention, I grant—but your use of it is pathetically crude. If you had only let me teach you the elements of political and financial engineering, you wouldn't be guilty of such monumental blunders."

Jenkins tightened his clammy hands on the cylinder.

"You're a young man, Nicky." His uncle's rawboned face shone with an honest, kindly sympathy.

"And your accomplice in this pathetic little plot is, I believe, a young and lovely girl—Adam Gast called on the private wire a few minutes ago, you see, to inform me that Jane Hardin had got you out of jail."

"So?" Jenkins said.

"Don't you see the flaw?" Brand beamed at him. "Two bright young people, with everything to live for—you won't kill yourselves."

"Oh!" Jenkins breathed again, smiling bitterly. "Call the Worringer Clinic, on Obania," he said quietly. "Ask Worringer how long I'm going to live."

Brand made a mute little gasp of pain.

"Nicky!" he whispered. "What do you mean?"

"I was on Freedonia when that shot struck," Jenkins told him hoarsely. "Worringer gives me about a week." He lifted the cylinder. "Now do you want to shake this—just to see if it's tomatoes?"

Brand stepped quickly back.

"No." He stood wiping the palms of his hands and his sweat-filmed face with the gaudy handkerchief. "Steady, Nicky," he urged suddenly. "Careful with it!"

"Will you load the condulloy?"

Brand's fine gray eyes narrowed with a righteous indignation.

"We'll load it," he agreed at last, "if you're so vast a fool. But I warn you that you won't get far with your loot—or with the Fifth Freedom either, if you should start the plant."

"That's my problem," Jenkins said. "Call your men."

Brand turned deliberately, to beckon at the gold-and-purple mansion. Three short brown men carrying automatic rifles emerged instantly, and he called to them in melodious Spanish.

"English, please," Jenkins rapped.

"There's no trouble men," Brand said, easily. "I'm just shipping eighty tons of condulloy, in my nephew's charge. Call Manrique and his squad, and have Vidal drag out the automatic loader. Move along—Mr. Jenkins is in a hurry."

Jenkins backed warily against the ground gear, carefully clutching that small can. He watched two small swarthy men drag the thick, weightless serpent of the loading tube from a side door of the mansion, pulling out the collapsed metal segments to bring it to the valves of the tug. He saw it writhe and shudder like a live thing as the first heavy ingots came through, moved by pulsating paragravitic fields. The two dark asterites stacked the emerging ingots in the hold, and Martin Brand stood beside a transparent window in the tube, watching the automatic counter. He seemed to Jenkins oddly unconcerned.

"Take it, Nicky," he murmured genially, when the last silver-gray bar had clicked into place in the hold and his Latin followers had retracted the tube. "I always intended to set you up in life—though

I'm sorry to see you involved in this fantastic scheme."

His lean head stooped regretfully.

"The metal doesn't matter. I lost ten times as much when the market broke today, and I intend to make it back tomorrow. But I'm sorry for you, Nicky." His vibrant voice turned solemn. "That attacking fleet, you know, is operating somewhere in the space between here and Freedonia. I imagine you'll be running into more and better seetee weapons."

Brand waved his hand, in a wide, sardonic gesture.

"So long, Nicky!"

Still grasping that small cylinder gingerly, Jenkins climbed back up the accommodation steps. Jane Hardin was waiting for him in the tiny wardroom, and she watched him set the bright can back on the galley shelves. Her blue eyes held admiration and a veiled amusement.

"So you bought a few hundreds of millions in metal with an unlabeled can of tomatoes?" Laughter tinkled in her voice. "I doubt that Mr. Brand himself ever pulled anything quite so slick. I'd like to see his face when he hears about it."

Jenkins paused a moment, frowning at her.

"I'm not sure I won." Seeing her puzzlement, he explained. "My uncle has had a great many such victories as that, and he really only defeated himself."

Her admiration almost angered him, for he wanted to despise such

slick ingenuity. His goal was the vaster and more generous victory of the Fifth Freedom, and that was still remote.

He climbed on to the pilothouse, and lifted the tug at full acceleration. Busy plotting a course for Freedonia, he had no time for less immediate puzzles. But the girl stood watching him, and the cool amusement in her blue eyes began to trouble him as much as Martin Brand's seeming unconcern.

XVI

The *Good-by Jane* was six hours from Freedonia, decelerating, when a gray pip showed on the radar-scope. A bit of seetee drift, Jenkins first thought, strayed somehow from the deadly swarms about the rock. He was swinging the tug to avoid it, when a metallic voice crashed from the photophone:

"Craft ahoy! Identify yourself."

Consternation froze him. Adjusting the tug's transmitter with numbed fingers, he tried to decide what to answer. The ship ahead, he knew, must be one of the unidentified attackers—and the brittled-toned command told him nothing, for English was the lingua franca of the spaceways.

"Tug *Good-by Jane*," he rasped into the microphone. "Bound from Pallasport to Obania." For it would be suicidal, he knew, to admit Freedonia as his destination. He tried to swallow the sudden dryness in his

throat, adding huskily, "Who are you?"

Waiting for an answer, he read the distance pip. The stranger was only twelve hundred kilometers ahead—point blank range for spatial guns. No seetee missiles would be required to smash the unarmed tug. A ten centimeter spatial rifle would be enough.

"*Warcraft Seetee Invader*," came the brisk reply. "Of the Free Space Republic."

"What?" Jenkins gasped. "What republic?"

"The Free Space Republic was proclaimed yesterday, by the people of the asteroids," that crisp voice informed him. "Obania is the temporary capital, until Pallasport surrenders. *Seetee Invader* is flagship of the Free Space fleet."

Hope began to brighten the dark dismay of Jenkins. For the people of the rocks ought to be his friends. He recalled asking old Jim Drake about the outlawed Free Space Party.

"I don't meddle with them," the lean old asterite had told him. "I've suspected that Bruce O'Banion is involved in some of their intrigues, but I'm an engineer, not a politician."

"But you asterites get such a raw deal, under the Mandate," Jenkins remembered protesting. "I'd like to see something done."

"I'd like to see the asteroids free." A brief fire lit the old man's faded eyes again. "But I still believe what I've always told O'Banion—that

the Brand transmitter can do more to free the rocks than all his complicated plots and schemes."

Now, turning eagerly from the radar to the hooded lenses of the periscope, Jenkins found the photo-phone light of the other vessel, a red point trembling among the steady stars. Breathless with hope, he whispered anxiously:

"Who is head of this new republic?"

"No permanent government has yet been formed," rapped the voice on the modulated beam. "The revolt is a spontaneous movement of the people, lead by the Free Space Party."

"Who are the Party leaders?"

"You are asking for military secrets," that brittle voice reprimanded him. "The Party leadership must be concealed from our interplanetary enemies until victory is assured. The provisional governor of Obania, however, is Mr. Bruce O'Banion."

"Good," Jenkins said. "I want to talk to him."

"We are also bound for Obania," came the other voice. "We shall escort you there."

"I don't need an escort—"

"But you do," came the instant reply. "For a Mandate fleet is already moving this way, to break the rebellion on Obania. With your asterite connections, Mr. Jenkins, you are in danger of capture or destruction."

Jenkins nodded—wondering uneasily when he had mentioned his

name. He decided he hadn't. But he couldn't afford to meet the High Space Guard. The charges against him no doubt now included piracy in high space as well as treason against the Mandate.

"Besides," that unidentified voice was adding, "we notice that you are dangerously off your true course, in the direction of a marked swarm of seetee meteors. Correct your course at once!"

Jenkins hesitated, fingering the control wheel uneasily. He didn't like the coldly imperative tone of that voice, or understand how the speaker knew his name. Wistfully, he searched the dusty dark of space, beyond that shivering atom of red.

Freedonia hung there somewhere, still too far for his eyes to see or the scope to find, but only six hours distant. The ancient tug was faster than she looked. The drift itself, when he came a little nearer, would fog search scopes and intimidate pursuit. His hands were tightening decisively on the wheel, when Jane Hardin's bright head came out of the ladder well.

"Nick!" Her eyes were violet with anxiety. "Is something wrong?"

"I don't know." He studied her taut, lean face, wondering uneasily how the people of that other craft knew his name. "But we're landing on Obania."

For it didn't matter whether the warcraft ahead came really from Obania or from some vaster planet, or whether it carried seetee missiles

or only spatial rifles. The unarmed tug had no chance at all. Perhaps old O'Banion could help him get to Freedonia—and he didn't want the cool charm and the vital mystery of Jane Hardin canceled out by death.

He corrected the course for Obania.

The drift-pitted tug landed on that jagged planetoid three hours later, twenty minutes ahead of the escort. Jenkins had called Bruce O'Banion from space, and that aged asterite leader was waiting when he stepped down from the valves.

The war had already wounded Obania. Jenkins paused at the bottom of the rusty steps, appalled. Behind him, he heard Jane Hardin utter a hushed little cry of shock and pain. Dismayed, he stared blankly around the convex field.

In the center of the spaceport had stood the great six-sided Mandate building, headquarters of the Guard detachment that had governed Obania. That once-impressive fortress was blackened wreckage now, with thin smoke still drifting from the rubble.

Beside the ruined fortress lay the burned hull of a tall Guard cruiser, fire-stained and flattened. Craters pocked the field beyond it. Fire had darkened the sagging sheet metal of shops and hangars and warehouses. A battle tank lay overturned and abandoned.

But the bright new Seetee warehouse, Jenkins saw, had somehow escaped destruction. Above the

white gleam of its trim sheet metal, a new flag was flying. Green stars were patterned to make a larger star on a field of black—the colors, he supposed, of the new-born asterite nation.

“Welcome, Jenkins!” Old O'Banion's voice was round and almost pompous with the habit of political oratory, but a fierce triumph rang in it now. “Welcome to the sacred soil of the Free Space Republic.”

Little soil clad the naked iron and stone of Obania, and the small group of soldiers behind the asterite politico showed an equal bareness. They still wore the ragged gray of miners, and their only uniform was a black armband, sewn with a crude green star.

They were haggard, grimy, unshaven men. Several wore dark-stained bandages. But all of them were armed with automatic rifles, and they all wore a fierce elation.

“That's what happened to our oppressors.” Gesturing widely toward the humbled fortress, O'Banion spoke with a careless slur. He looked intoxicated, with the dull glaze of his hollowed, bloodshot eyes and the clumsy sway of his massive body. But it wasn't whiskey, Jenkins knew, that made him drunk. It was victory.

“We struck yesterday morning,” his tired voice rasped. “At nine, Mandate time. The party had supplied us four tons of maximite, and we had made four bombs. One planted under the cruiser and one

under the fort, and two in reserve. We blew up the cruiser and stormed the arsenal."

His white-maned head nodded toward the smoldering fortress.

"But some dirty spy must have tried to sell us out," he rumbled bitterly, "because the bomb under the fort was discovered before it went off. Tanks came out, and tried to take the town. I thought we were done for."

"But we fought for freedom." O'Banion's weary shoulders lifted. "We had mortars from the arsenal, and we stopped the tanks with them. Finally two young men volunteered to make missiles of themselves, with the maximite bombs fastened to their dirigible armor. The guns of the fort got the first, but the second hit like a fission bomb."

The paunchy man struck an orator's pose.

"Those two humble rock rats sacrificed their lives." His tired voice strove for eloquence. "But their act established the Free Space Republic. History will long remember the simple nobility—"

Anxiously, Jenkins interrupted: "What about our engineers in the hospital?" He nodded urgently at the road toward the Worriinger Clinic, secluded in its iron-walled canyon beyond the equator of Obania. "Can Worriinger save any of them?"

"How should I know?"

"They weren't hurt in the battle?"

"There was fighting around the hospital, but I don't know."

O'Banion shrugged his massive shoulders, with a tired impatience. "I've had no time for anything, except our hard battle for the freedom of the rocks. I've been busy at the photophone, since we won our little victory here, organizing and commanding asterite uprisings on a dozen other rocks."

The eyes of Jenkins moved from the reeling old man to his squad of ragged, wounded followers with their crude arm bands and their looted weapons awkwardly held. A sudden pity choked him.

"You don't really hope to break the Mandate?"

"We've had reverses." O'Banion sighed heavily. "Thousands of brave asterites have lost their lives for freedom. We failed, in Pallasport, to storm the government buildings. Our uprisings have been crushed everywhere, except here on Obania."

His haggard eyes peered forebodingly at the violet darkness of the sky above the shattered fortress.

"Even now," he added uneasily, "a Mandate fleet is reported on the way here, armed with the might of all the planets—with great spatial guns and fission missiles—to snuff out our last tiny spark of freedom."

Defiantly, the aged leader stiffened, adding grimly:

"But we're going to surprise our mighty enemies!"

Looking at the little squad of weary men behind him, Jenkins protested quickly:

"These miners can't fight spatial rifles and atomic missiles."

"We've better weapons now," O'Banion told him triumphantly. "The party is sending us a fleet of our own, armed with seetee—"

"Huh!" Jenkins started, searching O'Banion's gray heavy face with narrowed eyes. Did this revelation solve the riddle of the unidentified attackers, and explain the betrayal of Freedonia? Desperately he demanded:

"Where did you get seetee weapons?"

"That is a secret of the Party leadership." O'Banion shook his shaggy white head. "But Brother Stone has promised me that our secret fleet will smash the Mandate forces with self-guided seetee missiles, and enable us to hold this first citadel of the Free Space Republic."

Puzzled, Jenkins whispered: "Who's Brother Stone?"

The big man blinked uncomfortably.

"Please forget that name," he begged anxiously. "I shouldn't have spoken it. But I trust you, Jenkins." He lowered his husky voice. "Brother Stone is the Party designation of our supreme leader—and he still assures us victory, in spite of all our cruel defeats."

Jenkins moved to clutch O'Banion's heavy arm.

"You can trust me," he agreed. "But our power plant on Freedonia can do more to free the people of the rocks than this Brother Stone

and all his seetee missiles—if we can only get it going."

His voice dropped urgently.

"I already have the condulloy we need. I'm going back to try to finish the plant—alone, if none of our engineers can help." His fingers tightened desperately on O'Banion's arm. "May I take off? Right now?"

O'Banion's dull eyes looked evasively away into the dark sky.

"I've no authority to let you go," he temporized at last. "Better wait for the *Invader*. High Party men aboard—maybe even Brother Stone himself. I'll take up your case with them."

"But there isn't time," Jenkins protested sharply.

He didn't speak of the ruthless plant of death rooted and sprouting in his own flesh, but there were enough other reasons for haste.

"Might be your Brother Stone is only bluffing," he suggested desperately. "Maybe he really hasn't any seetee weapons, after all—or why should he let the asterites be defeated anywhere?" He gripped O'Banion's flabby arm again. "Won't you let me go on now?"

"I can't do that." The big man shook his head, with a massive regret. "Personally, Jenkins, I'm all for you, but Brother Stone demands Party discipline." Placating, he added: "The *Invader* is due in ten minutes now."

Looking at the ponderous stubbornness of his tired face, Jenkins yielded reluctantly.

"I'll wait," he agreed unwillingly. "Anyhow, I want to see my friends in the hospital."

For he needed the calm wisdom of old Jim Drake and the skill of Drake's mighty, red-haired son. Desperately he needed the strange abilities of the mutant spaceman, little Rob McGee, and the competence and courage of all the rest. The frantic hope came to him, that some of them might be awaking from the coma of ametine.

"Take my car." O'Banion gestured at the low, electric vehicle parked at the edge of the crater-

pocked field, beside the Seetee warehouse. "I must stay to meet the brothers on the warship."

"Please arrange for me to go on," Jenkins begged. "At once."

"I don't know." O'Banion looked off at the sky again, his dull eyes veiled, somehow hostile. "I can't promise."

XVII

Jenkins climbed back to lock the valves of the tug. He saw O'Banion's men stir and retreat with quick alarm when they saw the warning that the craft was ray-



contaminated. That, he thought grimly, should protect the priceless cargo.

Jane Hardin came with him, oddly aloof and quiet. She had stood listening to all O'Banion told him, saying nothing. He could feel a veiled and somehow disturbing tension in her. What sort of game, he wondered again, could she be playing?

O'Banion's car took them over the near horizon, and down the one winding street of the town. The brief war, Jenkins saw, had struck hard. Red flags marked unfilled craters in the pavement. Windows were shattered, walls bullet-marked. The new Interplanet building was a fire-gutted ruin.

Yet the town had an air of fevered triumph.

Ragged children waved and cheered at sight of the green-starred flag flying from O'Banion's car. A miner with a bandaged head shouted some cheery greeting and two men on new crutches saluted. Jenkins heard a peal of song from the Meteor Palace Bar.

They left the town and passed the rusty buildings over O'Banion's abandoned uranium mine. The narrow canyon road beyond led them to the night side of the rock. The lights of the car probed violet gloom between the dark cliffs, and found two women.

"Karen Drake and Ann Anders," Jenkins whispered to the quiet girl beside him. "Wives of two of my friends dying in the clinic."

He stopped the car beside them. In the purplish shadows, they both looked haggard and exhausted. Rick Drake's red-haired wife was thin and pale, her left arm slung. Clumsy with her burden, Ann seemed pinched and bent and stricken.

"How are they?" Jenkins whispered.

Ann shook her dark head, silently.

"No change, Nick," Karen told him softly. "Rick and Paul and all the rest are still under ametine. Dr. Worringer says they all breathed ten times too much of that. He says he won't be able to wake them for three or four days yet—and then they'll be dying of seetee shock."

"All?"

"Every one." She nodded wearily. "Dr. Worringer says there's nothing we can do, and I'm going home with Ann."

"Can we drive you?"

"Thanks, Nick." Ann shook her head and tried to smile, and didn't quite succeed. "But I must walk my mile today—for little Paul."

She had tried to speak lightly, but Jenkins heard the quiver of her voice. He looked quickly away from the stiffness of her lips and the wetness of her hollowed, haunted eyes. His glance came to the white sling on Karen's arm.

"Just a scratch," she said.

"Were you in the fighting?"

"A little bit," she told him. "Yesterday morning, you see, the Guard commandant sent a tank to take the hospital—you had just

landed there the day before, remember, with the sick men, and I suppose he suspected you had smuggled in weapons, too. Anyhow, the tank started shelling the clinic building from over the hill."

"It was dreadful," Ann, put in tearfully. "The first shell struck near the power pile, and all the lights went out."

"I took Ann to ask her father for help," Karen Drake went on, "but Mr. O'Banion couldn't spare any men to help us, or even give us any weapons. All that saved us, Ann thought of a prospecting gun Paul had left at home. We found that, and a sealed magazine of twenty-milligram seetee pellets."

"'Course it was made for testing the drift, not for a weapon." Ann took up the story, smiling with admiration for the tall girl beside her. "But Karen went out with it, after that tank. She had to get too close—because the pellets, reacting with the air, wouldn't go very far. That's how she got hit, when the tank men saw her. She went on, anyhow, and smashed the tank with a seetee shot."

"Not really!" Jenkins heard the startled note in Jane Hardin's voice. "That was a desperate thing for a woman to do."

"Rick was in there, asleep and helpless," the tall redhead explained softly. "And we were all fighting for the freedom of the rocks—and the Fifth Freedom, too, for men everywhere." She looked compassionately at the girl beside her.

"Ann's tired," she said. "We must go."

Jenkins drove on through the dark to the clinic. Silent beside him, Jane Hardin seemed oddly thoughtful, but he felt too harassed to ponder the riddle of her now. Once she turned as if to speak, but caught herself abruptly.

The damaged power pile must have been repaired, for the clinic building was brightly lit. Inside, Jenkins glimpsed Dr. Worringer striding down a corridor, and ran to overtake the dark-bearded radiation specialist.

"Please!" he whispered. "Wait—"

The great doctor swung with an habitual abrupt impatience—which must have been annoyance, Jenkins thought, with all his own failures to conquer the radiation illness that spacemen called seetee shock.

"Back to die, Mr. Jenkins?" he inquired curtly. "I didn't expect you quite so soon, but Miss Rasper has a room ready. Where's your hemorrhage?"

"No!" Jenkins gasped sharply. "I'm not dying—yet. I still feel well, and my work isn't nearly done. I need help. Is there any chance that one of the other engineers—"

Worringer shook his stern, dark head.

"None!" he rapped. "They'll all be blind and bleeding and helpless by the time they come out of the ametine coma." The keen eyes

probed him. "You haven't many days yourself, Mr. Jenkins."

"I'm all right—"

Ignoring his uneasy protest, Worringer took him into the consultation room, to examine his throat and study his eyes with a painful little light and take his temperature and swab another test smear on his arm. He tried to hope for some sort of miracle, until the impatient doctor rapped:

"Better get along with that work."

"How—" He had to gulp. "How long have I?"

"Minor hemorrhages any time now." Worringer frowned, as if with a brooding anger at his own defeat. "Vomiting and fever in two days. Blindness and total disability soon after. You really should stay—"

"No!" Jenkins whispered. He drew a long breath, and asked desperately, "Haven't any of them any chance at all?"

Worringer shook his head, scowling through the heavy beard.

"At first I had hopes for McGee," he said slowly. "The tests all showed a decreasing reaction, and I tried to think he was healing. Or even immune. I suppose you know he is something of a medical and psychological curiosity?"

"I knew he was—different."

"I've read the German monographs. Seems both his parents were recovered victims of seetee shock, and the genes must have been somewhat shaken up. The Martians who studied McGee called him

an adaptive mutation—Nature's first unsure effort to shape a new human type to fit the new environment of space."

"He's odd," Jenkins admitted, "but pretty shy. I did hear that he had unusual gifts and senses, and once I even thought he was trying to contact me by telepathy—that was after he had breathed that ametine." His voice caught. "Are . . . are you certain he's dying?"

Worringer nodded brusquely.

"Yesterday I still hoped that his mutation had made him immune to hard radiations. I hoped—" The bearded man laughed harshly at himself. "But I've hoped for too many miracles! McGee's fever's up today. He'll be dead before the rest."

Jenkins stumbled out dejectedly. Jane Hardin was waiting for him in the borrowed car, and he let her drive it back to the war-shattered spaceport. The *Seetee Invader* had already landed. Curiously, he studied that tall warcraft of the newborn nation.

"Rebuilt from a freighter," he observed.

For the black-painted hull, towering high above the rust-reddened *Good-by Jane*, still had the utilitarian squareness of an ore boat. Flat, rectangular turrets had been mounted amidships, with black spatial guns jutting forward.

A squad of O'Banion's tired amateur soldiers was standing guard beside the tug. The asterite leader himself, as Jenkins parked

the car, was coming down the ramp from the war vessel. Jenkins hurried to meet him, asking hopefully:

"May we take off now?"

The white-maned politico didn't answer. He came staggering dazedly toward Jenkins. His flabby body looked deflated, somehow shrunken, his heavy face pale and lax and stricken.

"Did you arrange—?"

"No," the old man muttered wearily. "You can't go."

Jenkins clutched his arm. "What's wrong?"

O'Banion drew a wheezing, painful-seeming breath.

"I've just talked to the Party brothers on the *Invader*." His words were groping and laborious. "They tell me we have failed. Brother Stone is not aboard, that even he has given up. He has given the order to surrender Obania to the approaching Mandate fleet."

Jenkins shuddered to a dark alarm.

"Then you must let me go," he whispered desperately. "Before the Guard gets here!"

Hopelessly, O'Banion shook his sagging head.

"Brother Stone has ordered us to hold you and your ship for the Mandate forces," he rumbled unhappily. "The Party brothers mentioned a treason case, and piracy charges pending."

"No—" Jenkins gasped. "I've no time."

"Sorry, Jenkins"—O'Banion shrugged his drooping shoulders—

"but the Party disciple is very strict. Nothing I can do. Sorry, but we'll have to hold you for the High Space Guard."

XVIII

A dull, hopeless anger took hold of Jenkins. He hated the stubborn stupidity of old Bruce O'Banion, and raged against the anonymous leaders of the Free Space Party. He detested the complacent aristocracy of the Interplanet directors, despised the sordid greed of the Mandate bureaucrats, and bitterly scorned the cynical schemes of his uncle.

All humanity, it seemed to him, impelled by its confusion of ignorant fears and blind desires, was somehow involved in a monstrous conspiracy against the bright dream of the Fifth Freedom. The engineering problems of the Brand transmitter were solved long ago, but the human difficulties loomed gigantic, complex beyond solution. The great barrier to human progress stood revealed as the nature of man himself.

Urgently, he tugged at O'Banion's arm.

"Listen!" he whispered. "Your revolt has failed—but the Brand transmitter hasn't. It can still bring peace and freedom to the people of the rocks—and all the planets."

He saw the brooding defeat in the old man's red, deep-sunken eyes, and desperately tried to vanquish it.

"That's the only chance!" he

urged frantically. "If you'll help me get away—"

"No use talking, Jenkins." O'Banion shrugged ponderously. "I've put everything into this Party movement. The last of my fortune. Years of planning. The lives of my friends. And we're beaten." He exhaled an exhausted breath. "I'll never try again."

Behind him, Jenkins heard a sudden whine of gears. Tires skidded and gravel rattled. He looked in time to see Jane Hardin race over the close horizon in O'Banion's car. A poor ally, he thought bitterly—trying to run away from the first real disaster. But she couldn't get far, on tiny Obania.

Impatiently, he swung back to O'Banion.

"At least, let me try to get away—"

"Brother Stone has already agreed to give you up," the old asterite informed him sullenly. "He is bargaining for a general amnesty for the Party members—to save us all from trial for treason. We must keep the terms."

"So you've sold me out?" Jenkins stiffened to a savage anger. "To save your own skin!"

"Don't—please don't say that." O'Banion began sobbing, ignoring the tears bursting out of his red, haggard eyes. "I'm an old man, Jenkins. Beaten. Betrayed, I think—for I still don't see why Brother Stone had to surrender, if we really have seetee missiles for the fleet. I

don't understand it, and I can't take anything else. Just let . . . let me alone!"

He turned and stumbled away, mopping with a blood-stained handkerchief at his tortured eyes. Jenkins let him go, turning desperately to the weary little squad of armed asterites guarding the *Good-by Jane*.

"You belong to the Free Space Party?" One of them nodded at him suspiciously. "That means you want freedom, for yourselves and other men," he told them urgently. "I want to tell you something about freedom."

They listened warily, grasping their stolen guns with an awkward readiness.

"Physical power is the basis of political power," he went on grimly. "The Mandate is able to oppress you because the governments of its member planets have joined to establish a monopoly of the fissionable elements and fission energy. Your rebellion has failed to break that monopoly of power. But there is another way to do it, with a new power-source—the seetee drift!"

They still listened, their lean, battle-soiled faces bleakly mistrustful.

"Free power!" he whispered huskily. "Just look at the actual meaning of that. The Brand transmitter, that we're trying to build on Freedonia, can supply free seetee energy to all men everywhere. That will mean economic freedom, and economic freedom will create political freedom. Our Freedonia plant

can set you free of the Mandate—and also from the rule of your own Party leaders."

Sullenly unbelieving, two or three shook their heads.

"I've materials here to finish that transmitter." He nodded imploringly at the stubby little ship behind him. "Won't you let me aboard? Give me a chance to escape—and I'll set you really free!"

"Shut up, mister." The squad leader spoke in a low, hard voice, nodding at a lean man in the kind of close-fitting white knit suit worn under dirigible armor, limping down the ramp from the converted ore boat. "He's coming after you."

"But won't you listen?" Jenkins whispered desperately. "Can't you see?"

"We listened," rasped the stubble-bearded leader, "but you don't make sense. We ain't engineers and we ain't politicians. We don't know much about power transmitters or economic freedom. We're just plain rock rats. But we're all good Party men, and Brother O'Banion ordered us to hold you till the Guard comes."

Jenkins shrugged bitterly. These were the people who needed the Fifth Freedom, but their ignorant suspicion had become a stronger fetter than the cynical greed of the men who ruled them. Defeated, he turned hopelessly to face the gaunt-faced Party official, approaching from the *Seetee Invader*.

Brakes squealed, behind him. The

squad leader stumbled back, rifle lifted in alarm. Jenkins turned to see O'Banion's car skidding across the crater-torn field. It lurched to a halt beside him, and Jane Hardin tumbled out.

"Nick, I think you need this." She was breathing hard, but her voice seemed oddly calm. "I went to borrow it from Karen Drake. The magazine is loaded with eighty twenty-milligram pellets of seetee iron."

She thrust the gleaming weight of the long-tubed prospecting gun into his arms. Astonished, he nearly dropped it. Swinging to face the armed miners, he saw their lifted weapons.

"Better not fire," he warned sharply. "This is a special meteor-testing gun—loaded with seetee. If a bullet should hit the magazine—"

He didn't need to finish, for these men had all used common testing guns with terrene pellets, and they knew the dreadful power of seetee. Two of them tossed aside their own unfamiliar weapons, prepared to dash for cover.

"Wait, men!" the squad leader shouted hoarsely. "Hold him!"

But these new recruits had learned no habit of discipline. Jenkins crouched to menace them with the long solenoid, and they broke into flight, discarding their weapons. The squad leader retreated undecidedly.

"Open the valves!" Jenkins gave his keys to the breathless girl beside him. "I'll take care of the *Invader*."

Silently, her bright head nodded. "Watch out!" The frightened squad leader called a sharp warning to the approaching Party man. "Look out, Brother Lazarene—"

That name dazed Jenkins like an unfair blow, but now he knew the stumbling man in white. It was Jean Lazarene, somehow strangely thin and oddly bent. But he had no time to ponder the change, or wonder how the quiet Earthman had come to be a high official of the Free Space Party. Trembling, he swung the slender solenoid.

Lazarene, habitually efficient, dropped promptly into a shell crater. Jenkins let him go. Escape was all that mattered now. Lifting the gun toward the open valves of the tall black craft beyond, he squeezed the trigger. The result appalled him.

The gun was a prospecting tool, not designed for war. Too heavy in his hands, it was awkwardly balanced. The telescope and the analytic spectrograph, still attached, made awkward encumbrances. Unshielded from the terrene air, the tiny projectiles began reacting at the muzzle.

But they were effective.

The gun itself was nearly silent. The pellets, stabbing their thin needles of white incandescence like contraterrene meteors in the upper air of Earth, made only a sighing hiss. But the explosions, when seetee iron canceled terrene steel into free energy, were splintering thunder.

Lazarene kept down out of sight.

The squad of asterites scattered in unsoldierly panic. Bruce O'Banion, staggering aimlessly back toward the warehouse which still flew the green-starred flag of his betrayed republic, turned to stare stupidly. The valves of the tall warcraft had begun to close. Jenkins turned that jet of fire against them, and they stopped moving.

Dazzled by that dreadful blaze, Jenkins swayed unseeingly. He had to lower the heavy gun. For a moment his ringing ears heard only silence. Then he caught the purring alarm of the geiger at his wrist—warning of the dreadful energies his shots had loosed against the ship.

"Nick—look!" Jane Hardin's voice was a sharper warning. "The guns!"

Blinking at the tall dark ship, he saw the flat turrets turning swiftly to depress the long spatial guns. He lifted the solenoid again, to spray both turrets with crashing flame. He fired at the projecting tubes of the range finder, at the periscopes and radar antennas, until he was blind again.

A heavy Guard cruiser, he supposed, might have been invulnerable to such improvised attack, but this converted ore boat had no massive armor or deflector screens. He couldn't see the guns, but he thought they wouldn't fire again.

"That ought to be enough." The girl's quiet voice came faintly to his deafened ears, and he felt her fingers on his arm. "I'll help you aboard."

She guided him back to the accommodation steps, and they stumbled breathlessly aboard the tug. His eyes could see a little, by the time the valves were sealed, and he blinked gratefully at her taut white face.

"Thanks, Jane," he whispered. "Though I don't quite understand you!"

"Why not?" Her cool blue eyes seemed faintly mocking. "Why mistrust your only friend?"

There was reason enough, he suspected—but he had no time for the riddle of her now. Clambering into the pilot house, he lifted the tug at the full power of the pile. The periscope showed him the battered *Seetee Invader* leaning on its ground gear, smoke drifting from the broken valves. The twisted turrets didn't move, and there was no pursuit.

XIX

Five hours later, beyond the swarms of contraterrene drift and the wheeling spatial mines, Jenkins dropped toward the jagged iron cube of airless Freedonia. A tired triumph possessed him, for the human barriers lay conquered behind. Ahead were only engineering problems, and he was trained to cope with them.

"We've won—almost!" he whispered to the quiet girl near him, in the gray-walled pilot house. "With any luck at all, the Brand transmitter will be running, before . . .

before that Mandate fleet can stop us."

He had nearly said before he died, but he checked himself in time. Jane Hardin didn't reply. He turned quickly from the hooded instruments, wondering at her silence, and found no reflection of his triumph in her veiled, watchful eyes. She stood frowning at him, with a perplexing air of troubled disappointment.

He wanted to ask her what the matter was, but he lacked little Rob McGee's uncanny perception of the movements of matter in space and time. The business of landing demanded all his attention. Anyhow, he tried to assure himself, she had aided him enough to prove her loyalty to the Fifth Freedom.

Beneath the descending craft, the craggy planetoid rolled slowly against star-frosted spatial night. Jenkins searched its sharp-edged fracture planes with anxious eyes, and felt a vast relief.

For nothing moved.

Nothing had changed. No men, he thought, could have been here to disturb the unfinished equipment. For the lonely rock, guarded by the drift and the mines, was now also defended by radiations from rock and metal that the seetee shot had poisoned. The geiger on his wrist began purring a new warning as he brought the tug down at the dock above the shop.

He turned to the girl, sharply concerned.

"I'll unload the metal as fast as I can," he promised her. "Then you

may take the ship back out away from these rays, to wait for me to get the transmitter going."

"I could help," she suggested quickly. "I'm a fair mechanic."

He shook his head, puzzled by that offer—for he was suddenly certain that she didn't really want to help. And the reason she didn't, the conviction seized him, was something more than any fear of radioactive isotopes.

"This job needs more than a fair mechanic," he told her softly. "I'll be working the condulloy on special automatic tools that are already set for it, and installing the coils and castings on machines that are half seetee. I'm afraid you couldn't help—and you've already been exposed to too much radiation."

"Then I'll wait," she promised quietly.

The stark suspicion caught him, then, that she didn't mean to wait. She had risked her life and her youthful loveliness to support him—or sacrificed them already, the chances were, to the slow poison of penetrating rays. He wanted urgently to like and trust her. But he couldn't.

The stakes were too great. Her manner was too aloof and alert. He couldn't shake off the feeling that she still was playing a deadly game—fighting, with all her nerve and skill, for some goal so vast that she would toss health or life away to gain it, without a second's indecision.

A well man marooned on this SEETEE SHOCK

radiant rock could scarcely hope to survive until aid could reach him. She would know that, he reflected—even if she didn't suspect that he was already within a few days of death.

"The nearest spatial mines are set in circular orbits a hundred kilometers out," he warned her gently. "They all have proximity detonators. Better stay twenty kilometers inside the shell."

She merely nodded, her blue eyes narrowed warily.

He left her in the pilot house, after she had showed him a somewhat surprising competency in astrogation, and he went down to climb into his stiff dirigible armor. An inner valve sealed off the lower hold, and a special pump sucked the air from around the stacked ingots of condulloy—for terrene air wasn't wanted on Freedonia.

He opened the lower lock, when the hold was evacuated, and dragged the segmented aluminum serpent of a paragravity carrier tube aboard, to swallow the heavy ingots and move them to the furnaces. When he had retracted the tube again and closed the valves, he called to the girl on his helmet photophone:

"Stand off, now, to fifty kilometers. I'll call you when the transmitter is ready to run."

The big lamp swung and flickered above the square stubby nose of the tug, and he heard her quiet voice.

"I'll be waiting, Nick."

But that was all. The taut hush

of her tone reflected none of his own breathless eagerness to open the gates to a new kind of civilization, but rather the desperation of near defeat. With no word to wish him success with all the difficult tasks yet before him, she snapped off the light and took the tug aloft.

Jenkins went to work.

The powered armor lifted him again, and dropped him into the dark chasm of riven iron that concealed the entrance to the shops. The automatic machine tools there were already adjusted, to heat and draw and wind and anneal the wire, to pour the castings, to mill and polish the transmitter elements. But machines need overseeing. He read dials and changed settings—and watched the white precious metal flow into finished coils and machinings.

Working, he lost the count of time.

Fatigue grew in him, and became a creeping illness. For that dark and dreadful plant within his flesh was coming at last into bloom. Fever parched him. Cold sweat turned his body clammy in the armor. Sickness drained away his strength. Giddy nausea overwhelmed him.

He vomited. Too ill to adjust the plastic container in the armor, he spattered the inside of the helmet and had to fumble his way, half-blinded, to the abandoned living tunnel. Washing up there, he saw himself in a mirror and gasped with a shaken disbelief.

For his hair was falling out, leaving bald patches on his scalp. His unshaven face was hollowed and thinned, bleak with pain and desperation. Blood oozed steadily down his cheek and chin from a tiny scratch the edge of the helmet had made on his temple. That red stain was the color of death. He knew the little wound would never heal, but he patched it with adhesive tape, and cleaned the helmet, and went back to finish the transmitter.

The generator coils were annealed at last, and he labored to install them. They weighed six tons each, too much for the strength of a dying man to manage. But he was still an engineer. He reset the selective pull of the paragravity unit at the heart of the rock to reduce their weight almost to zero, and then he used the power of his armor to tow them into place.

He fell asleep, despite himself, while the main cables were annealing. Hours later, it must have been, the distress of mounting illness aroused him. Fever was burning him again, and his parched hands were weak and clumsy with the controls of the armor.

Spurred by the dreadful urgency of ripening death, he went to work again, dragging the long thick cables through the conduits ready for them, from the generator to the tower on the iron summit above.

Then there were only the transmitter castings. Three polished machinings of dull gray metal, they seemed to him as massive as



planets. Even weightless, they stubbornly resisted every effort to move them, and then, perversely, kept on moving too far. They drank up his ebbing strength and bruised his fingers in the clumsy gloves.

But he towed them into place. He aligned them, with painful care. Groggily, swaying at the task, he tightened the connections and brazed them with condulloy metal. He inspected the assembly, tested all the circuits, and straightened

triumphantly in the chafing confinement of his armor.

The Brand transmitter was finished!

He saw red drops spattering the inside of his helmet, and knew his nose had begun to bleed. The first small hemorrhage, of many. He knew it would never stop, but that didn't seem to matter now. His work was nearly done.

The dirigible armor carried him back to the gloomy cavern that held

the reaction chamber. Awkward now in the powered suit, he missed the high control platform. He plunged on past it, fumbling feebly at the control studs, toward the un-touchable metal of the upper hemisphere and the red signs that warned: SEETEE—KEEP OFF!

The steel rails of the terrene barrier caught him. His trembling fingers found the studs again, and he alighted at last on the platform. Abruptly ill, he vomited again. Darkness came down upon him, and he thought he was blind.

He lay a long time, merely clinging to the platform rail, until he found that he could see again. Nearly too weak to move the stiff armor, he drew himself erect. He waited for his head to clear, and make meaning come back to the gauges and controls before him. He pressed buttons and pulled switches.

The generator ran.

A green indicator light told him that the Levin-Dahlberg field was functioning. The fuel-milling machines ran silently in that airless space, grinding terrene and seetee rock to dust. Separator coils refined the fuel, and paragravity injectors metered it into the reaction field.

Matter was annihilated there, but Jenkins saw no frightful fire. He heard no ultimate crash. He was not destroyed. For the reaction field contained that raving energy, and converted it into a silent tide of power flowing in the condulloy coils.

Meter needles crept over, as that river of tamed energy flooded higher. They steadied, as full output of the generator built up the power field extending beyond the far sun to the limits of the solar system. They dropped back suddenly, as the full potential was established and automatic relays shut off the flow of fuel.

Swaying over the board, Jenkins pressed one final button. Fever was burning his body. Unquenchable thirst consumed him. He felt the drip of unstauntable blood from his nose. Illness crushed him down, until only the cruel stiffness of the armor supported him. Yet he clung to consciousness, and tried to listen.

“People of all the planets—”

Those triumphant words came faintly, from the speaker in his helmet, spoken in the deep voice of old Jim Drake. A red photophone light was flickering on the board, and his mind could see the powerful automatic photophone and ultra-wave beam transmitters above, sweeping every rock and planet in the ecliptic with that recorded announcement, as Freedonia turned.

“The Fifth Freedom has arrived!” Drake’s canned voice proclaimed—for he had planned and toiled against this crucial hour. “Free power is flowing out from our contraterrene plant, and all you who hear can tap the power field with simple tri-polar receptors.

“Receptor voltage is set by the dimensions of the elements, current

output limited only by circuit resistance. Specifications are—"

Jenkins vomited again, into the rubber bag beneath his chin. Sweat was clammy on his body, and the vast, untouched machines beyond the barriers blurred and dimmed. But he tried to listen, and he heard Drake's recorded voice again.

"... benefit all men. But there are men too blind to see the good. There are a few selfish men and women, anxious to preserve their cruel old monopoly of power, who will attempt to stop the Brand transmitter. We beg all common men, everywhere, not to let that happen."

A pause, and then the tape repeated:

"People of all the planets—"

But Jenkins didn't try to listen any longer. His small concluding part of the great task was done. In time, he knew, the plant would require maintenance and fuel—but then he wouldn't be alive.

For a long time he hung there on the high platform, slumped inside the rigid armor. Darkness came down upon him, and once more listed. The thing that aroused him at last was concern for Jane Hardin.

For she was waiting for him, dim recollection insisted. She was alone on the ray-contaminated tug, and she didn't know the safe passages through the spatial mines and the seetee drift around Freedonia. If

she tried to leave, she would surely be killed.

The image of her came to haunt his sick mind, the lean planes of her face white with some secret tension, her blue eyes strangely watchful and aloof. He didn't understand her, but she had aided him. Her enigmatic loveliness should n't matter to a dying man, but she had surely earned a kinder reward than death.

With feeble clumsy fingers, he groped again for the control studs of the heavy armor. He soared away from the platform, and lifted once more from the dark fissure that concealed the entrance to the shops.

Emerging into the blackness of the sky, on the night side of the rock, he wondered again if retinal hemorrhage had at last claimed his sight—for he failed to find the riding lights of the *Good-by Jane*. He was gliding hopefully toward the day side of the planetoid, when the helmet photophone brought him Jane Hardin's quiet voice:

"... problem to discover a safe course through the seetee drift and the spatial mines without a chart. But you've heard that automatic broadcast in old Drake's voice, proclaiming his fantastic Fifth Freedom. You must realize that the Brand transmitter has to be stopped."

Jenkins sagged in the heavy fabric, stunned. A fit of dry retching came and passed and left him drained of all vitality. Thirst was

hot dust in his throat. He tried to doubt what he had heard, but the girl's level voice throbbed again in his helmet.

"...desperate situation. Personally, I'm ready to face any risks necessary, to stop that machine. I suggest that the Mandate fleet be ordered to stand outside the swarms of drift, and bombard Freedonia with fission missiles. One hit on the seetee machinery ought to be enough to end this sort of mischief for another century or so. If the high commissioners agree, I'll stand by to report the hits. How's that?"

There was silence for a while, because he couldn't overhear the other half of the conversation. Stunned by the girl's duplicity, he wondered vaguely who could be at the other end of the beam.

"No, I haven't." Her taut voice came back at last, oddly regretful. "I haven't seen him since I left him on the rock, two and a half days ago. I suppose he'll have to die, along with his mad notion of a Fifth Freedom. Perhaps he'd rather have it that way."

Such staggering treachery was as incomprehensible as Jane Hardin's aid has been. Jenkins had mastered the final technical problem, but such human difficulties were too much to master. A giddy faintness came over him, and his sore belly muscles contracted weakly against the emptiness in him. His fingers slipped away from the studs. He drifted in the armor, lost in the spatial chasm, waiting to die.

XX

Jane Hardin's brittle voice aroused him, calling sharply:

"Nick! Nick Jenkins—can you hear me?"

He didn't answer, for he hated the girl. He lay faint and ill, floating in the heavy armor through caves of purple darkness, beaten and hopeless and eager to die.

"Are you hurt, Nick?" Her urgent words echoed insistently in the helmet, and he became slowly aware that he was not yet completely blind. For the sun-struck redness of the stubby tug was drifting close beside him, its photophone beam trembling to the girl's voice.

Still he didn't try to answer.

"Nick!" she called again. "I know you're alive—I picked up your helmet light, and I could hear you gasping. Please try to get to the valves. I don't know how to use this armor, but I want to help you, Nick."

Drifting, too ill to move, he asked bitterly:

"Has your spatial bombardment started yet?"

His voice was a husky croaking. His throat felt sore. He spat feebly against the helmet, and saw the color of blood. The dark roots of dissolution were spreading in him.

"Not yet," she told him. "Perhaps we can still get outside the mine shell in time, if you can show me the way. But the Mandate commissioners issued the order, and

your uncle says the fleet is on the way from Obania."

What had she to do with Martin Brand, since she had quit her job with Seetee? Or had she really quit? His sick mind phrased the questions, but he felt too ill to ask them. He caught the hush of pity in the girl's voice.

"I'm sorry, Nick."

"Sorry?" He tried to laugh, and hurt his raw throat. "Why?"

"I really am," her quiet voice throbbed. "And please try to get aboard, Nick. I know you're hurt—I can see the blood inside your helmet—and I really want to help you. Please—before the bombardment starts. When you know why I'm against your impractical schemes, perhaps you can forgive me."

"I don't think so!"

But the thirst was upon him again, hot torture in his throat. His limbs ached and throbbed in rebellion against long confinement in the cramping armor. A ruthless hatred burned in him, against this girl and the stubborn blindness of all mankind.

But he didn't want to die alone.

His numb and swollen fingers found the studs, to drive the armor awkwardly to the tug. He opened the outer valve and dragged himself aboard and somehow closed the massive door behind him. Air sighed in at last, and he must have unlocked the inner valve for Jane Hardin came to him.

The sight and odor of him turned

SEETEE SHOCK

her pale, but she resolutely helped lift the helmet, helped him out of the armor. He saw her swallow hard, as if trying not to be ill. Staring at him with eyes grown darkly violet, she whispered huskily:

"What's the matter, Nick?"

"Seetee shock." He swallowed at the pain in his raw throat. "I got it when the others did."

"You knew?" she breathed. "All the time?"

He nodded groggily, trying hard to hate her.

"Why did you help me" he croaked at her, "if you meant to turn against me?"

"I'll tell you, Nick." Her voice seemed husky with concern. "But right now you need medical attention. We must get you back to Worriinger."

"Why bother?"

"Please, Nick!" He was swaying drunkenly with the fevered weakness in him, and she caught his arm to help him. "I'll explain my side. The right side, I think. But first we must get you to Obania—if you can show me how to get out through those mines."

He glared at her with a drunken hostility.

"So you can show the fleet how to get in?"

"Don't, Nick!" She bit her quivering lip. "Take the wheel yourself—if you're able."

"I can manage," he told her bleakly.

But the weight of his lank body

seemed an intolerable burden. He reset the paragravity control to reduce the ship's internal field to .2 G; and even then, almost weightless, he still reeled to an oppressive dull inertia.

Laboriously, he pulled himself up the ladder toward the pilot-house. He tried to drink water in the galley, and it made him sick again. He rinsed his face and his bleeding mouth, and dragged himself on to the hooded periscope.

Freedonia was still a dark, uneven die rolling across the dusty black velvet of space. Still the bombardment hadn't begun. The contraterrene generator, he supposed, was still running undemolished; the mighty tide of power still flowing from the Brand transmitter.

Scowling feebly at Jane Hardin, he made her turn away from the instruments. He lifted the ship, but it was hard to keep his heavy brain upon the tricky problems of astrogation. Once he slumped against the wheel, and only the girl's urgent hand and voice aroused him to his task.

The tug had drifted dangerously off course, but he found the error in time. He occulted one star and another with the diminishing bulk of Freedonia, making the passage seem as difficult as possible. He swayed at the wheel, and the oozing blood began dripping faster from his nose, but finally he was past the winking, ceaseless warning of the last Drake blinker.

"We're out!" he croaked.

He wanted vaguely to ask Jane Hardin why she had befriended and betrayed him, but his swollen throat hurt too much. He tried to find Freedonia in the periscope again, to see if the bombardment had begun, but the lenses showed him only darkness. Darkness, that submerged him.

The next he knew, he lay on a hard hospital bed. The narrow, white-walled room was very dimly lit, and the gloom was kind to his throbbing eyes. The voices he could hear were hushed, the footfalls quiet, the hands that touched him very tender.

Once a nurse woke him, jabbing a needle into his arm to make an intravenous injection. Dr. Worriinger stood beside her, glowering through his black beard at her efforts to find the vein. Impatiently he took the needle, and his huge fingers thrust it very deftly home.

Jenkins wanted to ask if he had a chance to live, but he already knew the answer. He caught his breath to ask about Freedonia, but his throat was too painful for speech, his body too weak for any effort. He lay watching slow brown drops falling in a glass bulb above his arm, wondering how soon he would be blind, until presently he slept.

When he woke again, Jane Hardin and Martin Brand were standing beside the bed. His uncle looked tall and lean and fit, in a

magnificent gold sash and purple robe, but the girl was drawn too thin and bloodlessly pale. He caught his breath to whisper feebly:

"Are you sick—from the radiations?"

"A little." She shrugged. "But Dr. Worringer says I'll be all right." She moved a little toward him, adding urgently: "He says you mustn't talk, until your throat is better."

It never would be, Jenkins knew.

"But don't you worry, Nicky." Martin Brand tossed his dark hair back, with that old gesture of aggressive confidence. His voice held genial warmth, and his gray eyes shone with hypnotic candor. "Worringer says you're responding magnificently. He says you'll be getting up in a few days, now."

A kindly lie, Jenkins reminded himself. Jane Hardin may have been in time to benefit from treatment, but he knew he had gambled away his own slender chance at life, for the doomed dream of the Fifth Freedom.

He didn't try to ask about Freedonia, for they wouldn't want to wound him with the truth. Heavily, he moved his head a little on the pillow, to see Jane's face again. Despite that pallor of illness, she was beautiful. The shape of the bones under the thinned flesh was good, and her shadowed eyes still seemed generous and brave. He lay frowning at her, trying hopelessly to reconcile her loveliness and her treachery.

"Cheer up, Nicky!" Brand was booming jovially. "We just came in to ease your mind, because Worringer said you seemed despondent. Really, you haven't a thing to worry about."

Hopefully, Jenkins breathed, "Freedonia—?"

"Forget it, Nicky." Brand glanced at his watch. "The fleet should be in place by now, and the transmitter will be blown to mesons before it does any more damage."

Jenkins closed his eyes, flinching from the pain of that.

"So stop your brooding," rumbled Brand. "You're going free, when you leave the hospital. I'll have those charges dropped. The high commissioners do what I tell them since the merger went through, you see—or we'll have new commissioners!"

Jenkins stared dully at the rugged honesty of his uncle's face, groping again to understand this cheerily superior individual who had been the idol of his younger days and was now his smiling enemy, magnanimously triumphant.

"Don't look so bitter, Nicky," Brand urged smoothly. "I hope you know I'm not vindictive. I'm going to forget your raid on the Tor. In fact, I'm still holding you an engineering job with Seetee-Interplanet."

His eyes must have widened, for Brand explained happily:

"Yes, Nicky, the merger is already signed and sealed. The Inter-

planet directors were afraid to face seetee war without buying seetee know-how. The deal gives me working control of the new corporation."

Brand chuckled genially.

"A clever coup," he murmured. "Quite as ingenious, Nicky, as your deadly can of tomatoes. The Mandate government, you see, was never able to identify that elusive attacker. And still nobody suspects the identity of Brother Stone, who financed and engineered that pathetic little revolt of the Free Space Party."

Jenkins stiffened, whispering, "You?"

"Adam Gast," Brand told him cheerfully. "Acting under my instructions and using my money. Slickest lawyer in the Mandate. Interplanet never guessed."

Jenkins closed his eyes again. His sick mind saw the great cleats of a tank crushing a body not quite dead outside the jail at Pallasport. He saw red-haired Karen Drake, wounded defending her unconscious husband in this hospital. He saw the sagging face and the red, haggard eyes of old Bruce O'Banion, broken by betrayal. He drew his breath to gasp:

"Lazarene?"

"Our man." Brand nodded benignly. "S'pose I'd better tell you all about it, just to set your mind at rest. The whole affair, you see, was just a neat bit of politico-economic engineering."

Jenkins lay dazed with a gray astonishment.

"At best," Brand said, "Seetee was only a temporary device. The unexpected success of the project on Freedonia became a threat to the corporation, and our merger scheme evolved as the logical solution."

Watching the rawboned honesty of his uncle's genial face, Jenkins tried to understand.

"Jean Lazarene is a capable spatial engineer. He had been with me in several projects on other planets, and I knew him. I arranged to plant him on Freedonia to report Drake's progress—you, Nicky, being my nephew, were intended as a sort of decoy, to keep Drake from suspecting anything."

Painfully, Jenkins tried to swallow the bitterness of that.

"*Seetee Invader* was an ore boat we bought on Venus," the tall man rumbled. "Refitted at a private base, here in the rocks, with guns we bought on Mars. O'Banion's party furnished us men enough, after Adam Gast took it over."

Men, Jenkins thought sadly, who believed they were fighting for freedom.

"Lazarene brought out charts of the mines and the drift, when he staged that mental breakdown," Brand went on serenely. "He planted the ametine bomb, when the time came, and shut off the beacon to signal the *Invader*. Not a hitch—until you turned up on the seetee bull."

Brand's red, candid face smiled reprovingly.

"You almost upset everything, Nicky. We hadn't planned to hurt anybody. But Lazarene saw you moving, and fired that shot to cover his escape." Brand smiled genially. "Lucky your injuries were no worse."

Jenkins lay bitterly still.

"That's almost the whole story." Brand beamed triumphantly. "Gast, acting as Brother Stone, ordered the asterite revolt—to screen our other activities. *Seetee Invader* fired a few missiles at Mandate installations, just to show the existence and the value of seetee know-how. Then we invited the Interplanet officials to a private demonstration of those same missiles, and signed them on the dotted line." Brand chuckled happily. "Nice bit of engineering, don't you think?"

Jenkins shook his head.

"Sorry if you feel hurt." Brand's cheery face turned briefly grave. "But you're young, Nicky. You'll get over your wild idealism, as I did. You'll grow up—and realize that our youthful civilization is still too immature to survive the impact of seetee power."

Jenkins stared a grim protest.

"We'll hold that job for you," the tall man promised. "We'll even let you keep on playing with seetee—privately—if you are still so rash. But the planets aren't ready for the Fifth Freedom—not until the large investments in uranium and thorium have been fully liquidated."

Jenkins didn't try to answer. His throat hurt too much for speech, and his shocked and sickened anger was a thing beyond expression. He shut his eyes against the honest sympathy on Brand's rugged face, and turned his head to see the girl again.

Her hair was bright as the sun's corona, and her pain-shadowed eyes seemed almost purple. Sight of her made a sharper ache in his swollen throat—but now he knew the heartless scheming her loveliness had masked.

He tried to fight the abrupt, hot anger that possessed him—for he had no right to jealousy. He couldn't take her with him when he died. But he couldn't help the trembling weakness that took hold of him, or the tears of rage that blurred his aching eyes.

"Nicky!" She must have seen the savage accusation on his face, for her voice was an outcry of hurt protest. "Don't . . . please don't—"

An indignant nurse interrupted: "You really must leave now. Mr. Jenkins needs to rest."

"Sorry, Nicky," Jane said. "'Bye till tomorrow."

His tall uncle caught her arm casually, and they went out together. She smiled back from the doorway, pale and troubled and lovely. Jenkins tried to swallow his hatred, and tried to remember her lean-fleshed face. Tomorrow, he thought, he would probably be blind.

Jenkins still could see, when Jane Hardin came next day. She was alone. Her bright hair was freshly done, and he thought her hollowed face had a better color. The shadow of illness seemed almost lifted from her violet eyes.

"Don't try to talk," she began quickly. "I promised Dr. Worringer not to upset you, but I must explain a few things." Her voice was troubled and urgent. "Because I can't let you think I'm so terribly bad."

He waited, glad the blindness hadn't come. He let his eyes follow the firm, clean planes of her face and the shining sweep of her hair. He tried not to think of why he had to hate her.

"I've only done what I know is right," she insisted softly. "I'm sorry we had to be on different sides. Because I . . . I like you, Nicky. Won't you try to understand?"

He nodded; he could try.

"I belong to an Interplanet family." Her shoulders lifted. "Do you know what that means, Nicky? Probably not, but I've been learning all my life. My father is an Interplanet director, and his father was. They always taught me to feel that our Interplanet shares are more than property. A kind of trust. An obligation. Can you understand that?"

He moved his head, in bitter assent.

"I understand." His whisper was a harsh, painful rasp. "You're rich—and seetee power would wreck your fortune."

Anger flashed blue in her eyes.

"It would." Offended pride lifted her bright head. "More important, it would betray civilization. The Interplanet families aren't quite so shallow or so selfish as our political enemies have taught you, Nicky. Interplanet was created to be the trustee of fission power, remember. Like you spatial engineers, we have our own code of service."

He watched her, distrustfully.

"Look at it our way," she urged. "Physical power creates political and military power—which misguided men can use unwisely. Atomic energy nearly destroyed humanity, two centuries ago, before the supernational body which evolved into Interplanet was set up to administer it. Seetee is a new danger, far more deadly."

Jenkins shook his head.

"Look at the consequences of your fine-sounding Fifth Freedom!" her vibrant voice challenged. "After ten years of free power, all the present day power installations will be rusted away and abandoned—and power needs multiplied a hundred times. Do you see the meaning of that? The men in control of the Brand transmitter will hold a knife on the single artery of civilization. It would be an invitation to any power-mad fool, to set up the ultimate dictatorship."

She laughed scornfully.

"Is that your idea of freedom?"

Jenkins moved his head, in mute protest. His throat hurt too much for talk, but he knew that old Jim Drake had foreseen such dangers and planned against them. The immediate guarantee of the Fifth Freedom was the building of additional stand-by transmitters, far apart in space, each staffed by engineers from a different planet.

But the final solution would be created by the Fifth Freedom itself—so Drake had hoped. For dictators were made by struggles for the sources and the fruits of energy, out of men twisted and embittered by want and fear—so Drake had believed. In the more spacious and generous world of Drake's mighty dream, the conditions for war and tyranny would not exist.

"We were afraid of your uncle," the grave-eyed girl went on. "A dangerous sort. Ambitious and able—without the fine tradition of responsibility that the centuries have ingrained in the Interplanet families."

Her thin, vivid face was intense with purpose.

"That's why I came to space," she told him softly. "To join the battle against your uncle and his corporation. My father had no sons, you see, and the duty fell to me." She smiled wistfully. "That's why I was so hurt, when I found you were Brand's nephew."

Jenkins answered the smile uncertainly; he couldn't hate her now.

"I took that office job with Seetee, just to spy on your uncle," she admitted. "You won't approve of that. But try to remember that your uncle was an enemy to our family trust, to a whole way of life that has lasted two centuries. He was grasping for a new order of power, and he didn't have the training and the ideals to be trusted with it. He needed watching."

That was true: Jenkins nodded.

"But he's able." A somewhat rueful admiration lit her eyes. "Maybe he suspected me. Anyhow, he never let me know anything about his intrigues with Gast and Lazarene and the Free Space Party. That's why I thought you were involved, Nicky."

He blinked at her quiet face, astonished.

"You were Brand's kinsman," she insisted softly. "And sole survivor of the raid on Freedonia. You seemed obviously guilty. That's why I got you out of jail—with the help of the Earthmen on the commission. And why I went with you to Freedonia."

He frowned at her doubtfully.

"I had you cast for Lazarene's part," she explained. "And thought your uncle had somehow double-crossed you. When I got you out, I meant for you to betray his scheme before he and Gast could force us into that merger—which looked like one clever step toward a seetee dictatorship."

"But I was wrong." Her shadowed eyes smiled wanly. "You didn't lead me to any rendezvous of the unidentified attackers. You didn't expose your uncle's plot—not even when we visited the Tor. All you did was start the Brand transmitter. But that forced through the merger."

Jenkins caught his breath to speak.

"Don't try to talk," she urged. "But it seems the Fifth Freedom was as dangerous to your uncle's schemes as it was to Interplanet. We had to join forces. Brand, as usual, played the shrewder hand. He controls Seetee-Interplanet.

"But he's not half so bad as we thought," she added hopefully. "I think he's big enough to learn the old traditions of the company. Perhaps he'll be great enough to hold the know-how of seetee power as a public trust, until men are finally able to endure its impact."

Jenkins swallowed painfully.

"What about Freedonia?" he gasped. "Is it wrecked?"

"Please don't hurt your throat." The girl looked pale and anxious. "I don't know about the fleet. The censorship is still on, and I've no official contacts here. But I'm afraid of trouble."

He caught his breath, but she didn't let him speak.

"Over the Fifth Freedom." She smiled unhappily. "You came very near success with that fantastic scheme, Nicky. Those canned

broadcasts caused riots everywhere men heard them. Martial law has been declared on every planet, until the crisis passes."

Jenkins lifted his head, aquiver with sudden hope.

"Where . . . where's my uncle?"

"He went back to Pallasport," she said. "You see, those automatic broadcasts started panic on the markets everywhere. Even Seetee-Interplanet shares broke dangerously. Mr. Brand is fighting to save the corporation."

The nurse came then, to send the girl away and prepare Jenkins for another intravenous injection. The serum made him drowsy. He slept at last, until excited voices roused him. Jane Hardin burst into his room again, trembling with controlled fury.

"Nick Jenkins!" Her hushed voice was bitterly accusing. "Do you know what you have done?"

He merely stared, bewildered at her anger.

"The censorship is off." She stood clutching the foot rail of his bed, her knuckles white as the enamel. "And you'll be happy to know that your precious transmitter's still running!"

He sat up weakly, shaken with an unbelieving relief.

"Lie down!" she stormed. "Let me tell you what you've done."

He sat grinning uncertainly.

"The fleet failed to bombard Freedonia," her hard voice rapped.

"The crews heard that recorded broadcast, and refused to fire."

His smile widened.

"Grin!" she whipped at him. "But Seetee-Interplanet has gone bankrupt."

That sobered him briefly. Interplanet had dominated many worlds for two long centuries. Even though he hated its oppressive power, he knew it had not been wholly bad. He could see the girl's love for the lost splendor of it, and share a little of the tragedy she felt.

"Your own uncle's ruined," she added savagely, "along with all the rest of us. He sold the Tor and all that condulloy to support the market, and the break wiped him out. He barely got away with his life."

"How's that?"

"The new government ordered his arrest—this insane Fifth Freedom forced governmental changes on all the planets, you see, and a temporary commission has been ap-

pointed to liquidate the Mandate. But your uncle got away, aboard the *Adonis*."

Jenkins scarcely heard her, for he was dazed with an overwhelming awe. He sat swaying uncertainly on the bed, wishing he could see the unfolding age of the Fifth Freedom. But the dark fruit of death was ripe in his flesh, and ready to fall.

"See what you've done!" Jane Hardin cried bitterly. "I hope you're happy now."

She strode away, and Jenkins lowered himself carefully back to the sheets. He clung to the image of her, white and taut with wrath, her bright hair swept back, her eyes almost luminous. He wished, with a bleak agony of longing, that he might live to know her in the different world dawning.

"Congratulations, 'Nicky!'" Brand's hearty boom, next day, aroused him from heavy sleep.



"They've let me come to wish you well in your bright new paradise."

Brand stood straight and tall at the foot of the bed, two watchful men in Guard uniform at his elbows. A folded jacket on his arm didn't quite conceal the polished links that held his wrists. Jenkins sat up stiffly in the bed, trying to dislike him.

"Yes, they caught me." Brand nodded at the handcuffs, almost cheerfully. His angular face looked hollowed, his ruddy color paled, but his fine gray eyes had kept their genial, penetrating shrewdness.

"These new commissioners want my hide," he rumbled softly. "A symbol, I suppose, of the old order they're tearing down. I was caught on little Nuevo Jalisco—my men wanted to defend me, but I've already caused killing enough."

His rawboned face turned soberly regretful.

"So they're taking me back to Pallasport," he added quietly. "This new government is going to put me on trial for my alleged war crimes, as soon as they get a tribunal set up. I understand they'll want the death penalty.

"So I may not be seeing you again, Nicky." The tall man shrugged, almost casually. "Sorry I've nothing to bequeath you, but the Fifth Freedom has left me unencumbered. Anyhow, I hope you'll forget our little differences." He put out a lean hand, trying awkwardly not to show the handcuffs. "Shake, Nicky?"

Jenkins quit trying to resist his old admiration for Brand's unquenchable audacity, and took the offered hand.

"Thanks, Nicky." Brand's gaunt face lit cheerfully. "You know, I almost regret the haste of these new commissioners. I'd really like to see if the Fifth Freedom can be as splendid as I first expected, twenty years ago."

One of the guards touched his shoulder.

"So long, Nicky." He tried to wave his hand, and the bright little chain stopped his wrist awkwardly. "Hope you won't feel too hard. Personally, I haven't many regrets. The Tor was quite a place, even if I die for it now."

The guard tugged at his sleeve. "Coming," he rumbled softly. "Luck, Nicky!"

XXII

Jane Hardin didn't come next day.

Jenkins lay watching the door, wearily hoping for her, when Worringer came stalking in. He tried to find a patient fortitude as the bearded specialist jabbed his flesh and listened at his chest, looked in his throat and probed his eyes with a painful blade of light. He swallowed at last to whisper anxiously:

"Well, doctor? When do I kick off?"

"Don't ask me." Worringer glared sternly at a timid-looking

nurse swabbing test chemicals on the chest of Jenkins. "You might get too much, next time. But your hemorrhages have stopped. Lesions healing cleanly."

"Huh?" It came to Jenkins that the soreness was gone from his mouth and his throat. "You mean—I'm not dying?"

"You can leave the clinic tomorrow."

"But—" Jenkins blinked unbelievingly. "I thought—"

"You were nearly gone when Miss Hardin brought you back," Worringer said, "but it turns out you had already brought us your own specific—in the veins of Captain Rob McGee."

Jenkins merely stared.

"Never saw such a case!" Worringer paused to study the stinging test stains, and nodded with a grudging approval. "Thought he was dying, when that fever hit. But every symptom disappeared. He's naturally immune. Only answer possible is adaptive mutation."

Jenkins shook his head dazedly.

"Evolution," rasped the bearded man. "Biologists and philosophers can squabble forever about mechanism and teleology, but life does adapt to changed environments. And McGee is shaped to fit an environment which includes hard radiations."

"But—" Jenkins caught his breath. "What did you do for me?"

"Twenty cubic centimeters of serum prepared from McGee's blood, injected intravenously. It

stimulates regeneration of the injured cells. I've already isolated the active agent—a new hormone, apparently formed in the suprarenal cortex. I'm confident of successful synthesis." He glowered triumphantly at Jenkins. "So we've licked seetee shock."

Jenkins sat awed and voiceless, grasping that.

"The others?" he whispered suddenly. "The Drakes and the rest—can you save them?"

"All but one man, who is already dead."

Dread shook Jenkins, waiting for that man's name.

"The one I couldn't save was Jean Lazarene."

"Oh!" That taciturn outcast of Earth had surely earned his death, yet Jenkins shivered. "I must have killed him," he muttered faintly, "with that prospecting gun."

"Wrong. The man was already dying. Made me listen to his last confession. Seems he was involved in this asterite revolt. Said he stole seetee machines from your Freedonia plant, and tried to install them on another rock. Something went wrong. Tried to get away, but he wasn't far enough when the blast caught him. Nearly gone when O'Banion brought him here. I tried the serum, but he died last night."

The nurses let Jenkins get up that afternoon. In robe and loosely flapping slippers, he shuffled down the corridor to look for McGee and

the Drakes and the other engineers from Freedonia. He found they had been discharged. He was padding back to his room, elated but lonely and impatient to be out, when Rick Drake's red-haired wife arrived.

"Rick got out last night," she told him happily. "With a few drops of Cap'n Rob's wonderful blood in him, and feeling fit as ever. He wanted to see you, but you were sleeping and the nurses wouldn't let him in. He started back to Freedonia this morning, with his father and Cap'n Rob, to see about the Brand transmitter."

Alarm caught hold of him.

"Has anything gone wrong?"

"Open this." Smiling mysteriously, she gave him a little package. "Ann wanted me to bring flowers, but Rick said you'd like this better. Even if it's just a toy."

Eagerly, he opened the box. He found a small light bulb and another tiny gadget made of insulating plastic, sheet copper, and a few turns of wire. Peering at it, he caught his breath.

"A Brand receptor!" he whispered. "Does it work?"

"Try it."

Anxiously, he twisted the bulb into the gadget. It lit—and its tiny glow was enough to show him the illimitable might of the Brand power field, pervading all the planets of man. It was a searchlight, probing feebly into the misty splendor of a new human era.

Discharged next day, Jenkins started out to look for Jane Hardin. She had been a determined enemy, but he had no reason to hate her now. The Fifth Freedom would dissolve old barriers, heal old conflicts. He wanted to know the person she would be, in the new age dawning.

She met him on the steps of the clinic building.

"So you're really well again, Nicky!" Her blue eyes smiled at him, delighted, yet uncertainly contrite. "I've come back to say I'm sorry," she told him softly, "because I've been wrong about several things."

Her fine skin was flushed a little, aglow again with health, her eyes dark with feeling. She was very lovely, Jenkins thought, and paused to rejoice that the dark weed of death had been uprooted from his own flesh.

"Your new Fifth Freedom is something different than I expected." Her low voice held a breathless eagerness. "I've seen it come to the people of this little rock, and I can imagine what it does to people everywhere."

He saw the bright wonder on her face.

"It lights a new kind of life in their eyes," she said. "You can hear something new and glad and good, even in the way the children laugh. Come on, and see what's happening."

He stood enjoying the gleam of

light on her soft hair and the generous warmth in her eyes.

"Men are already repairing the machinery above that old uranium mine," she told him. "Fixing it to run from a Brand receptor. Only now they're going to take out iron and copper and tungsten, that weren't worth recovering before. They're going to refine and work the metal with seetee power—and build more terraforming units to reclaim more rocks."

And she was his enemy no longer; he clung to the bright certainty of that.

"I've been staying with old O'Banion's daughter," she went on quietly, "the Mrs. Anders, who's going to have a baby. And she's wonderful, Nick. I've learned from her that these asterites are really—people. I believe they have as much honor and character and integrity, really, as the Interplanet families."

Her level eyes came to his.

"Can you forgive me, Nick, for being such a snob?"

Nodding happily, Jenkins seized her hand.

"Oh!" Her breath caught. "I almost forgot—did you hear about your uncle?"

"What about him?" Grimly, Jenkins tried again to put out the lingering spark of his old admiration for Martin Brand. He tried

hard to feel that Brand ought to die for his expansive crimes. "Has the case come up?"

Jane Hardin nodded, blue eyes gay.

"The verdict?"

"Acquittal," she said, "at the examining trial. The charges were dismissed when his lawyer pointed out that he invented the Brand transmitter, and really originated the Fifth Freedom."

"Huh!" Jenkins couldn't help a gasp of relief. "How did you find out?"

"He called from Pallasport this morning, to tell me he was free and ask about you. Seems he has made a quick adaptation to the Fifth Freedom. Says he is already organizing a new corporation."

Jenkins stared, astonished.

"Titan, Inc." Jane smiled quizzically. "It will be chartered to terraform that large moon of Saturn. He says the new commissioners and the judges who tried him have all signed up to buy stock. He's holding a block of shares for you."

"Generous of him." Jenkins grinned. "But I've another job. We still have those stand-by transmitters to build, to guarantee the Fifth Freedom. And, right now, we've a new world to see!"

They turned, and paused, and came down the clinic steps together.

THE END

19
F
9

BY ARTHUR C. PARLETT*

A fact article concerning a long known, but newly applied element—the uniquely paradoxical, immensely important element fluorine.

Have you heard the story about the gas

That ignites glass wool . . .
Whose presence makes asbestos burst into flame . . .

Which can produce flame beneath the surface of water . . .

That fires platinum . . .

That was essential to the development of the atomic bomb . . .

Whose compounds are among the most stable, the least stable, the most toxic, the least toxic of any known to man . . . ?

Draw up a chair, Bub, and meet FLUORINE. What a girl! Whatever you say about her is probably true. Dangerous. Hard to know

and harder to tame. But oh! so worth the effort!

Fluorine, most reactive of elements and first of the halogens, stands today as the basic building stone of a series of compounds rapidly elbowing their way to first rank importance in industry, medicine and almost every art or science touched by chemistry.

Teflon, fluorocarbons, hydrofluoric acid, boron trifluoride, fluoroborates, plastics, lubricants, solvents, insecticides, heat transfer media, pharmaceuticals, compounds inert to flame or shock or chemical attack, compounds of a violence and instability that call for iron nerves in a researcher; catalysts, gases, water white oils, crystalline solids, acrid smokes, gums and goos with almost any properties you wish to name are being drawn from the autoclaves of new industries feeding

* The writer wishes to express his appreciation of the help his colleague J. D. Rice extended in the final preparation of this article.

upon fluorine and fluorine compounds.*

Fluorine has been known to exist for the last one hundred forty years; was first isolated in 1886, but it is only today that it has been tamed sufficiently to be the potential economic and chemical giant it now is. From a pre-Manhattan Project asking price of seventy-five dollars per pound, Fluorine is now quoted at twenty dollars per pound in four-pound cylinders, and it is freely predicted that it will drop to one dollar within the next few years. Some of the braver prophets talk in terms of twenty-five cents a pound, to which this writer can only say, "It's possible!" in his best non-committal manner.

The beginning of the story dates back to 1771 when the great chemist Scheele recognized hydrofluoric acid—HF—as a definite compound. Then, as now, it was produced by the action of strong acid on fluorspar—calcium fluoride. It took over forty years, however, before the Englishman, Davy, recognized that an unknown element was present in the derivatives of fluorspar, an element with properties similar to those of chlorine, but with an energy level tremendously higher. Thus began the monumental task of isolating element 9, a task that was not com-

pleted until 1886 when Moissan, working with a special electrolytic cell, withdrew fluorine from the anode.

Failures there were in abundance. The isolation of this element became the classic problem of the eighteenth and nineteenth centuries. The difficulties were staggering. It is worth considering some of them, for to study the breakdown of one attempt after another is to appreciate the unusual properties of this most violent of elements.

The ordinary methods of chemistry were useless. It is often possible to displace an element from one of its compounds by adding a third element to the system, where this third element is more active than the one which it displaces. No substance, however, has a stronger bond than does fluorine for those elements with which it combines, and therefore reactions of the displacement type could not be used.

Electrolysis was next tried. The results were startling. Carried out in an aqueous solution, elemental fluorine was released in the presence of water. Immediately the fluorine wrenched hydrogen from the water to form hydrofluoric acid plus free oxygen and a good percentage of ozone. Should the hydrofluoric acid reach a concentration of fifty per cent, the introduction of additional fluorine produces the spectacular effect of flame beneath the liquid surface. This is interesting but elemental fluorine has not been isolated.

* Fluorine is far from being a rare element. It is as plentiful as carbon or nitrogen on the land masses and exceeds the abundance of chlorine. But the difficulties involved in bringing it under control have until quite recently kept it out of the public eye.

Modified electrolysis was then attempted. Instead of an aqueous solution of a naturally occurring fluoride, the attempt was made to use a molten bath of fluoride alone, and pass the direct current through the melt. The idea was fundamentally sound, but it did not work. The molten fluoride proved to be a nonconductor of electricity.

Again and again and from one angle after another, the researchers hacked away at the bond holding element 9 in chemical union and at last fluorine was successfully separated as an element.

"When you got your finger on him—there he ain't!" said the Irishman about the flea. So it proved to be with this *enfant terrible* of elements, for the fluorine immediately it was torn loose from one compound formed another, in this case with the materials from which the separation apparatus itself was made!

Man, with all his drive, his inner compulsion to take things apart and rearrange them, required something over seventy-five years to isolate fluorine from the time it was known to exist.

Moissan provided the last piece of ingenuity required when he worked through to pure fluorine by a roundabout electrolysis of molten fluorides. Starting with anhydrous and chemically pure acid potassium fluoride — KHF_2 — and applying heat, Moissan obtained pure anhydrous hydrogen fluoride as a nonconducting colorless liquid boiling

at 19°C . In this anhydrous—water-free—liquid he dissolved additional acid potassium fluoride which will conduct electricity. Hydrogen fluoride, the solvent, and originally a nonconductor was then discovered to behave like a conductor in the presence of the dissolved KHF_2 . The latter is really the electrolyte, but in Moissan's cell it is the solvent that is eventually broken down.

As to materials of construction, it was found that platinum and platinum-iridium alloys were fairly resistant to fluorine at low temperatures,* and it was later discovered that copper could be employed because, although readily attacked by fluorine, the product is a layer of copper fluoride which acts as a protective coating against further reaction: this is exactly analogous to the oxide layer which protects aluminum against oxidation and gives this metal its valuable corrosion resistant properties. To maintain a low temperature to prevent vaporization of the hydrogen fluoride and to protect the platinum-iridium apparatus from fluorine reaction, the tube containing the electrolyte was kept immersed in a bath of boiling methyl chloride— CH_3Cl —the boiling point of which

* It is unwise to conclude, however, that fluorine is entirely safe to handle at low temperatures. At a temperature of -252.5°C ., Moissan and Dewar broke a tube containing solid fluorine in a vessel of liquid hydrogen. In writing up the account of the experiment for *Comptes Rendu*, they reported that a violent explosion took place which "shattered to powder" their equipment!

is approximately -23°C . Utilizing this system built upon the accumulated knowledge obtained bit by bit through thousands of unsuccessful previous attempts, Moissan withdrew molecular fluorine at the anode and hydrogen at the cathode.

When the atomic project developed an urgent need for commercial quantities of fluorine, the generating cells developed closely followed Moissan's technique. The electrolyte is generally potassium fluoride-hydrogen fluoride or potassium acid fluoride-hydrogen fluoride in varying ratios. Sometimes lithium fluoride is added to lower the freezing point of the melt and to inhibit anodic polarization. The anodes are of carbon or graphite or nickel, although this latter material is less suitable than the others because of its tendency to form sludge and its low current efficiency above 150°C . Cathodes are generally of steel as the anhydrous operating conditions inhibit its corrosion. Other suitable cathodes are of monel metal or silver.

Cell construction and melt composition vary somewhat with temperature of operation, the lower the operating temperature the greater the ratio of hydrogen fluoride to potassium fluoride in the melt. Going from elevated to low temperatures— 250°C . to -50°C .—anodes are generally graphite, carbon, nickel, platinum or platinum-iridium in that order. Cell bodies run from copper or magnesium to iron or steel, to nickel to platinum.

Present commercial cells run up to two thousand amperes load, fluorine production for a cell of this design when using carbon anodes runs between two and three pounds per hour—using nickel anodes production will drop to between one and two pounds per hour, the difference being accounted for because of decreased current efficiency: in the opinion of this writer the only advantage of the nickel anode is its structural strength.

The fluorine obtained from the cells does not ordinarily exist in the atomic state, but as the diatomic molecule F_2 —molecular weight of 38.00. It is a greenish yellow, acrid smelling gas which liquefies at -188°C ., and solidifies at -223°C . Like chlorine it is a deadly gas, and, like bromine, it will produce severe burns on contact with the skin. At its boiling point the liquid is 1.11 times as dense as water at 15°C ., and at 15°C . fluorine vapor is 1.31 times as dense as air. It cannot be liquefied above -129°C . It is the most reactive of all elements, so reactive that the difference between it and its nearest competitor is almost in kind rather than in degree.

A measure of chemical reactivity is the so-called electronegative potential which is numerically the potential developed in a cell consisting of a standard electrode of hydrogen surrounding a platinum plate, and an electrode consisting of the element in question. The greater the potential developed the greater the chemical reactivity of the

element. Note in the following table that the measured potential of fluorine exceeds twice that of either of its two nearest competitors, chlorine and oxygen, neither of which are noted for their restraint:

Fluorine	—2.85 volts
Chlorine	—1.36 volts
Oxygen	—1.22 volts

The combining capacity of fluorine has been expressed in this statement by Dr. Earl T. McBee of Purdue University—one of the great centers of fluorine research in the United States: "Many times more fluorine containing compounds are theoretically possible than there are known compounds today!" And because of the extreme properties of this element it is reasonable to assume that many of its compounds will have uses that cannot be duplicated by other combinations of elements.

The writer has been surprised at times to find even among technical men great lack of information concerning the role fluorine played in the development of the atomic bomb. Yet, without fluorine, the development of atomic energy for military purposes would have been greatly delayed. Coincidentally with the theoretical work on the bomb, new techniques for the production and utilization of fluorine and fluorinated compounds had to be produced. The interdependence was complete, therefore, because without

the atomic project the terrible urgency of the conquest of fluorine would have been lacking—and also the money!

It was not until 1942 that a serious and coordinated research program was undertaken on a large scale in the field of fluorine chemistry and this as the result of the need for fluorine as an uranium volatilizer in the development of the atomic bomb.

Most ASF readers already know that one method of uranium isotope separation employed is that of gaseous diffusion; which depends upon the fact that the rate of diffusion of one vapor (A) with respect to another (B) is given by the square root of the inverse ratio of their molecular weight. That is, letting (U) equal the velocity of diffusion and (MW) the molecular weight, then:

$$U_A/U_B = (MW_B/MW_A)^{1/2}$$

There is nothing mysterious about molecular weights. UF_6 is a short way of saying that one atom of uranium has combined with six atoms of fluorine to form the compound uranium hexafluoride. The atomic weight of uranium according to the isotope you are considering will be either 234, 235 or 238. The atomic weight of fluorine is 19. Then the molecular weight of UF_6 will be one of these:

$$\begin{aligned}234 + (6 \times 19) &= 348 \\235 + (6 \times 19) &= 349 \\238 + (6 \times 19) &= 352\end{aligned}$$

In 352 tons of $U^{238}F_6$ there will be 114 tons of Fluorine and 238 tons of uranium; in 349 pounds of $U^{235}F_6$, there will be 114 pounds of fluorine and 235 pounds of uranium; in 3.48 grams of $U^{234}F_6$ there will be 2.34 grams of uranium and 1.14 grams of fluorine.

The actual concentration of U^{234} is so small that it can be ignored to a first approximation.

The use of fluorine compounds in the separation of uranium isotopes is desirable because Uranium Hexafluoride volatilizes from the solid state — sublimes — at 55.7°C. at atmospheric pressure. Thus a gaseous uranium compound is produced at low temperatures, whereas uranium itself melts only in the neighborhood of 1850°C. Also, since fluorine has only one isotope, the separation of the isotopic uranium-fluorine compounds requires no more than several thousand pumps and a few acres of membrane rather than the n^{th} power of these tools that would be required were the problem complicated by several isotopes of fluorine.

According to the formula above, the ratio of the diffusion velocities of $U^{238}F_6$ to $U^{235}F_6$ is given by the square root of 352/349 or 1.0043, which is the enrichment per stage, assuming one hundred per cent efficiency which, of course, is never attained. You might find it instructive to calculate how many stages would be required to concentrate $U^{235}F_6$ to 85% concentration, as-

suming 0.74% initial concentration and no recycling. You will also appreciate how much it meant to the project that F^{19} is the only isotope of Fluorine!

Substantial quantities of pure elemental fluorine are required for the fluorination of uranium. But the requirements for fluorine do not end there. Indeed, they are hardly begun. Uranium hexafluoride is deadly dangerous and not much less corrosive than fluorine itself. The quest for inert gaskets, pump packings, lubricants and heat transfer media able to withstand its attack, brought forth the answers in a new series of compounds, the fluorocarbons, which are compounds analogous to the hydrocarbons, but in which all of the hydrogen has been replaced by fluorine.

Hydrocarbons, the carbon-hydrogen compounds have achieved their importance because of their value as fuels in the internal combustion engine, as sources of thermal energy and, more recently, as building blocks in organic synthesis as exemplified by the growing petrochemical industries. That is, they are important fundamentally because they burn and because they react.

Fluorocarbons, on the other hand, the compounds of fluorine and carbon, are characterized by their extreme chemical stability. They do not react; they do not burn. Next to the inert gases such as helium, these compounds are probably the most inert of all materials,

and it is for this reason that they are achieving an increasing importance in industry.

Yet there is a drawback to their widespread use. At the present time the completely fluorinated organic compounds can be prepared only by a series of complex and costly chemical reactions. At Oak Ridge, Clinton Works, et cetera, the fluorocarbons were essential for the above mentioned purposes. No possible substitutes were even remotely comparable, hence their cost was justified. Techniques are being worked out that will reduce the cost of their preparation, but how long it will be before these are available is problematical.

One hopeful sign is the recent announcement of Professor Maurice Stacey, of Birmingham University, made to the Royal Institute of Chemistry telling of a new fluorine compound that will permit automobiles to run a lifetime with no change of oil. At the time of this writing no technical information is available here on this British development but it would appear that one or more of the technical difficulties in the way of general use of the fluorocarbons has been overcome.

In this country the fluorination treatment of lubricating oil is quite severe. DuPont reported that such a fluorination changed the Viscosity Index of a lubricating oil from 65—to—674, in other words, the good viscosity-temperature relationships

of the hydrocarbon was drastically worsened by fluorination. It is probable that this deterioration has been caused by cracking, isomerization or other molecular change. It certainly cannot be said with any certitude that the mere substitution of hydrogen by fluorine has caused this change and it may well be that Dr. Stacey has the problem licked.

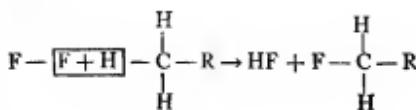
Fluorocarbons have freezing and boiling points very close to hydrocarbons of a corresponding structure and number of carbon atoms. Their boiling points are low compared to their molecular weight—a characteristic also shown by the inert gases. They are apparently substances with a minimum molecular cohesion as shown by low surface tensions and high fluidities. Their liquid densities are from one and one half to two times that of corresponding hydrocarbons and they resist most chemical reagents, even the alkali metals—sodium and potassium—up to high temperatures. One of these—Teflon—has achieved prominence as the “indestructible plastic” and, indeed, it is news when some substance is reported that will affect this almost perfectly inert material. Finally, by starting with a given hydrocarbon it is possible to fluorinate the compound in a stepwise manner and thereby synthesize a series of intermediates of varying stability and properties. Compounds of the Freon series—used as efficient and nontoxic refrigerants—are of this class.

Compounds with carbon atoms to which only one fluorine atom is attached are quite unstable and some of these spontaneously decompose. If two or more fluorine atoms are attached to a carbon atom, as in the Freons, the compound is generally quite stable and can be decomposed only with difficulty. Compounds of the form $-\text{CF}_3$ are extremely stable. As an example, fluoroform $-\text{CHF}_3$ —has been substituted for nitrogen in air and guinea pigs exposed to this atmosphere for several hours have shown no ill effects. This enhanced stability of $-\text{CF}_3$ and $-\text{CF}_2$ exerts a stabilizing effect on elements attached to the substituent carbon groups—they are the molecular equivalent of the medieval chastity belt. It has been found, for instance, that some fluorocarbons can be heated with fuming nitric acid without being in the slightest degree affected. As a rule of thumb and a rough indication of the result of partial fluorination of hydrocarbons, it is approximately true that replacement of one half the hydrogen atoms in any given hydrocarbon by fluorine is sufficient to render the resultant compound non-flammable.

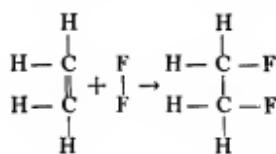
It is common experience that chemical reactions either take in or give off heat as they proceed, that is, some have to be coaxed to perform, and stop the reaction when the stimulus is withdrawn, whereas others just have to be brought to the proper pitch and a reaction starts

which is self-sustaining. These two types of reaction are known as endothermic and exothermic respectively. Moissan's preparation of anhydrous hydrogen fluoride is an example of the former, the burning of wood or coal is an example of the latter. The quantity of heat involved is measured quite accurately and, in the units of the c.g.s. system, is expressed in kilogram calories, which unit is not as difficult to picture as you might think. A kilogram calorie is simply the quantity of heat required to raise one kilogram of water from 15° to 16°C .

The breaking of the bond between two carbon atoms is an endothermic reaction; the quantity of heat required is termed its "heat of dissociation" and is seventy kilogram calories. When a molecule of fluorine (F_2) reacts with a hydrocarbon, the reaction can be pictured thus:



Now the heat given off by the formation of hydrogen fluoride, the "heat of formation," is one hundred three kilogram calories; the addition of fluorine to double bonded carbon pairs as in ethylene, like this:

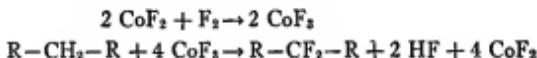


releases one hundred seven kilogram calories.

In simple terms what this means is that the energy needed to break an organic molecule apart is more than supplied by the hydrogen-fluorine or carbon-fluorine reaction. And, as one might readily suspect, the preparation of fluorocarbons from hydrocarbons involves the problem of controlling the reaction, for fluorine running wild can not only ruin the chemistry but the chemist as well.

Probably one of the earliest syntheses of fluorocarbons was the direct fluorination of finely divided particles of hot carbon to produce carbon tetrafluoride (CF_4) and very small yields of such higher fluor-

If it is unwise to send a boy to do a man's job, then it is overzealous to send a man to do a boy's job. If fluorine is too drastic as a fluorinating agent, then it should be possible to use another compound, say a metallic fluoride wherein the metal has a high valence, and secure milder results. This proved to be the case when the fluorination was done using such compounds as cobalt or manganese trifluoride in some diluting agent such as carbon tetrachloride or Freon in the liquid phase, or nitrogen in the vapor phase. The fluorination reactions thus made yielded increased amounts of the heavier fluorocarbons. The reactions involved are:



carbons as C_5F_{10} and C_6F_{14} . Later the reaction was modified to a vapor phase combination of fluorine and pure hydrocarbon or mixture of hydrocarbons—such as light lubricating oil—in the presence of copper gauze as a catalytic agent. This method provided a variety of fluorocarbons ranging from gases through volatile liquids to lubricating oils and heavy tars. In some instances, paraffinlike waxes were also produced. However, the control of the reaction was poor and the end products were mixtures of fluorocarbons with no predominance of those heavier fluorocarbons suitable for lubricants and greases.

The apparent disadvantage here is that the preparation and regeneration of the cobalt fluorine carrier is an expensive process and the availability of cobalt for large scale work presented a problem. Now, if some cheaper, more abundant, fluorinating agent were found—

The action of hydrogen fluoride on chlorinated hydrocarbons was the answer. In fact all but the final hydrogen atom could be replaced by fluorine using this method, and the use of hydrogen fluoride as a fluorination agent greatly decreased the consumption of electrolytic fluorine which, at the time of the

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Manhattan Project, was none too abundant.

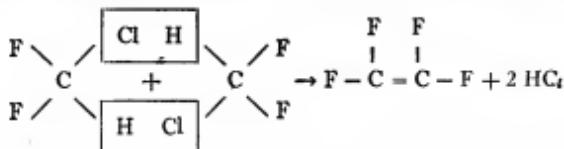
In practice, the chlorinated hydrocarbon is placed in a nickel lined autoclave and hydrogen fluoride added from a gas cylinder. The autoclave is then heated to reaction temperature—100-200°C.—and the charge subjected to agitation until the pressure reached a constant level signifying the completion of reaction. The apparatus is then cooled and the liquid products poured from the reactor for separation and analysis. The final fluorination step converting the monochloro perfluoro compound to the perfluoro compound is made by the stronger fluorinating agent CoF_5 , although for certain of the requirements involved in uranium isotope separation partially fluorinated hydrocarbons or their chlorinated equivalents—e.g. dichlorotetradecafluoroheptanes—could also be used, as it has already been shown in this paper that partial fluorination, as in the case of the Freons, is often sufficient to produce the required degree of chemical stability.

Several additional synthesis meth-

ods were developed under wartime pressure. One of these involves the preparation of greaselike compounds through the polymerization of chlorotrifluoroethylene and fluorination of the resultant polymer to produce high molecular weight highly-fluorinated carbon compounds. In a similar process, a lubricating oil, polymerized perfluorovinyl chloride ($-\text{F}_2\text{C}-\text{CFCl}-$)_x can be made from a fluorinated chloroethane.

Tetrafluoroethylene ($\text{CF}_2=\text{CF}_2$) is probably the most well known of the fluorocarbons by virtue of the usefulness of its plastic polymerization product, Teflon. Tetrafluoroethylene itself is a gas liquefying at -76.6°C . and freezing at -102.5°C . Surprisingly enough and unlike most fluorocarbons, the monomer ($\text{CF}_2=\text{CF}_2$) itself will burn in air to form carbon tetrafluoride and carbon dioxide. Teflon, of course, is nonflammable, although if not kept free from contamination may be ignited by fluorine under high pressure.

Preparation of tetrafluoroethylene is relatively simple and involves the pyrolysis—thermal reforming—of monochlorodifluoromethane in an inert reaction tube—silver or platinum—at temperatures above 650°C . Basically, the reaction is



ods were developed under wartime pressure. One of these involves the preparation of greaselike compounds through the polymerization

However, as with almost all organic reactions, other products are also formed. Among them in this case is a group of compounds of the

form $H(CF_2)_n Cl$ where n may have values from 2 to 14. They are all stable and inert and all, with the exception of $H(CF_2)_2 Cl$ are brand new, and run the gamut from gases through liquids to solids.

The data now being obtained indicates that almost every carbon-hydrogen bond can be replaced by a carbon-fluorine bond to produce an endless list of new, and for the most part, yet undiscovered compounds having properties vastly different from known organic compounds, properties that are duplicated by no other materials on Earth.

Have you ever seen an oxy-hydrogen torch in action? It's pretty spectacular, isn't it? Cuts most metal as fast as the ads say a pretty girl cuts a man with dandruff. Hot, isn't it? Well, pal, it's not much more than a foot warmer compared to a fluoro-hydrogen flame. The ratio of heat liberation from the combustion of a given quantity of hydrogen in fluorine to the same quantity of hydrogen burned in oxygen is about 2.2 to 1.

Burning one gram molecular weight of methane (CH_4) in oxygen liberates two hundred thirteen kilogram calories of heat. Burn the same sixteen grams of methane in fluorine and you get four hundred fifteen kilogram calories. Acetylene on the same basis will give three hundred twelve kilogram calories in oxygen and six hundred thirty-five kilogram calories in fluorine.

Obviously, heat liberation is not

the only factor to be considered—you have to think about the dissociation of the reaction products. Obviously a combustion reaction which liberates a large amount of heat could not be used in a torch if much of the liberated heat were used up in dissociating the products at the high temperature of the reaction. Again, fluorine has the advantage, for, at a given temperature the degree of dissociation of a fluorine compound is lower than that of the corresponding oxygen compound despite the fluorine flame being so much hotter than the corresponding oxygen flame.

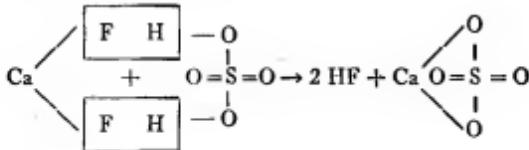
An experimental hydrogen-fluorine torch has already been constructed on a laboratory scale: hydrogen and fluorine are fed from cylinders through copper tubing to a copper torch tube, the fluorine passing down the center of the tube while the hydrogen moves through an annulus surrounding the fluorine tube.

An intense blue-white flame was produced which readily welded steel, nickel, monel and copper. The hot flame melts copper without oxidation and easily welds it because the copper fluoride formed melts at a lower temperature than copper itself and the operation thus is self-fluxing. On the other hand, attempts to weld aluminum by this method have so far been unsuccessful, probably because of the high melting point of aluminum fluoride.

If the torch is used indoors a hood is required. Outdoors, how-

ever, no special precautions are necessary as long as only small quantities of hydrogen fluoride are generated.

Hydrogen fluoride itself is probably the most important inorganic fluoride today because of its value as an inexpensive and versatile fluorinating agent, as a catalyst and as a starting point for the synthesis of many fluorine compounds. It is generally commercially prepared by the action of sulphuric acid on calcium fluoride, which occurs as the mineral fluor spar in Illinois and Kentucky in the United States and in England and other countries. The basic reaction is

$$\text{CaF}_2 + \text{H}_2\text{SO}_4 \rightarrow 2\text{HF} + \text{CaSO}_4$$


The hydrogen fluoride is marketed either anhydrous or as an aqueous solution, usually thirty and sixty per cent concentrations.

Hydrogen fluoride (HF) is a whitish gas of 20.01 molecular weight. It condenses at 19.4°C. and freezes at -83°C. At 13.6°C. the liquid has 0.988 times the density of water. Its critical temperature—the temperature below which it cannot be liquefied no matter what pressures are exerted—is 230.2°C. It is soluble in water in all proportions and is an excellent ionizing solvent.

It is extremely toxic and insidious in that, following exposure, a brief latent period occurs—usually a matter of hours—before its effects are noticed. The area of tissue contact then becomes reddened, then swollen and pale with a macerated appearance accompanied by intense pain. If adequate care is not given, severe ulcerations develop and necrosis occurs. Cases have been reported where HF has attacked bone structure, particularly in such exposed body parts as the fingers, and has destroyed the part to give an appearance resembling that of a whittled stick. It is not a material that will be found in toy chemistry sets.

Perfectly anhydrous hydrogen

fluoride as well as anhydrous fluorine may be safely shipped in ordinary steel cylinders. Dowmetal and K-monel have shown good resistance to its attack. As with fluorine, however, special precautions must be observed in handling hydrogen fluoride industrially. Such contaminants and moisture carriers as grease and pipe dope will cause localized "hot spots" to develop. These may lead to such temperature levels that the surrounding metal reaches its kindling temperature and the result is a

violent reaction of intense heat liberation in which molten metal is ejected through a fluorine flame causing great danger to personnel. The sequence of photographs on Page 163 shows very clearly that "hot spots" other than those your father warned you against are to be avoided.

Another peculiarity of hydrogen fluoride corrosion which the writer has observed while working with it in connection with petroleum research is its tendency to cause embrittlement in steel. To cite one example, in removing a bolted flange which had been exposed to anhydrous hydrogen fluoride it was found that the three quarter inch

steel stud bolts securing the piece snapped like glass rods under light wrench pressure. The fracture was similar to that shown by such a brittle material as silicon-iron.

Industrially, hydrogen fluoride has been successfully used as an alkylation catalyst in the petroleum industry to produce aviation grade gasoline. Several large scale refinery installations have been made using this process as against the more common method using concentrated sulphuric acid as the catalyst. Hydrogen fluoride has also been used as an isomerization catalyst, sometimes in conjunction with boron trifluoride and a desulphurizing catalyst in gas oil production.

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The aqueous solutions have long been used to etch glass, particularly in the production of artistically cut glass.

Sulphur hexafluoride (SF_6), a colorless, tasteless, incombustible gas with an inertness resembling nitrogen is a more or less new star in inorganic fluorine chemistry. Moissan, it is true, first described it, but it was not until some years ago that interest was taken in it when it was observed that SF_6 was an excellent material for high voltage insulation. In one laboratory installation using sulphur hexafluoride insulation for an electrostatic generator, potentials as high as 5.6 million volts direct current left it unaffected.

To be more specific about it, glass and mica are generally considered to be good insulating materials, and the dielectric coefficient of air is unity by definition. The dielectric coefficients of glass and mica range from two to ten depending upon temperature and humidity, whereas the mean dielectric coefficient of SF_6 —get this, now—is WELL OVER TWO THOUSAND! Its remarkable dielectric properties need no further comment.

The preparation of sulphur hexafluoride is quite simple and one does not need much imagination to predict a bright future for this material. To produce it, coarsely crushed sulphur is merely burned in a current of fluorine gas to produce a crude gas consisting largely of sulphur hexafluoride with small

amounts of other fluorides of sulphur and hydrogen fluoride, the latter probably coming from air leakage into the reactor.

Then there are the fluoborates. Compounds with great solubility, and the almost one hundred per cent anodic and cathodic efficiencies obtained in electroplating baths in which they are used permits the use of current densities higher than possible in ordinary baths without the oxide deposition known as "burning the plate."

The stability of the fluoborate bath is such that about the only electrolyte losses are those due to adherence of solution to the plated material when it is removed. Difficult electroplating problems such as alloy plating have been greatly simplified through the use of these versatile fluoborate salts.

I find myself at the end of this article with a tremendous amount of material not even hinted at. The job was simply too big. The problems of storage, compression, disposal of surplus fluorine have not even been suggested, yet these are every bit as important as anything else covered and to a professional chemist or chemical engineer might have even greater interest. The bibliography at the end is intended as an integral part of this story to close up the gaps left by this sketchy treatment of such an important subject.

The International Nickel Company's "Corrosion Reporter" put it this way: "Although not a rare gas

itself, fluorine is always rarin' to go." In 1948 those pioneering in fluorine chemistry agreed that the possibilities of tomorrow's compounds are even greater than the remarkable materials now known and partially described here. The ever widening wave created by the need for uranium hexafluoride is touching sciences far afield from Oak Ridge, and Element 9 promises your grandchildren teeth free from dental decay, promises you synthetic resins, fibers, new plastics, quicker cheaper and easier ways to operate your car, to heat your house, to hack the dollar sign out of many industrial processes now thought to be operating at maximum economy.

As Moissan, the pioneer, said, "He who works with fluorine must be prepared for surprises." He might have added, "He who lives in the age of fluorine development will also be surprised."

These are the things I'd like you to think about—pieces that will go into a never finished mosaic of accomplishment:

The curious ones, the grubbers among acrid tanks where the crackling of high voltage accompanies the green-yellow vapors of this demon element, the ones tacking down boiling points of new-born compounds, the man with the paper to present to the scientific journals; the increasing files of fluorine cylinders marching out of great chemical plants and marching into others to provide the raw gas fed to the autoclaves, the towers, the reactors; the

queer water white liquids boiling unaffected in fuming sulphuric acid; the guinea pig moving unconcernedly through atmospheres of new gases—and swiftly dying from one sniff of others just as new; the goggle-faced workmen sweating in hot, stuffy neoprene suits; the laboratory flash fire; the hand with the painful burns—new seas, new continents, new voyages for man's imagination and an ever growing list of new, brand new, compounds as the reward.

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10. Myers, W. R. & DeLong, W. B. *Chem. Engr. Prog.* 44, 359 (1948).
11. *Industrial and Engineering Chemistry*. Volume 39, No. 3. March, 1947. Above all others this publication for years to come will be the finest single source for detailed technical information concerning Fluorine in all its known aspects. We list below

authors and page numbers of articles which this writer found most helpful in writing this article, but the entire issue is a monumental achievement:

Bigelow, L. A., et. al., page 360.
Simons, J. H., page 238.
Priest, H. F., and Grosse, A. V., page 431.
Schumb, W. C., Young, R. C., Radi-
mer, K. J., page 244.
Fowler, R. D., et. al., page 266.
Froning, J. F., et. al., page 275.
Schumb, W. C., page 421.

PHOTOGRAPHS ON PAGE 163

Photos by courtesy of E. I. duPont deNemours & Co.
Originally published in *Industrial & En-*
gineering Chemistry—39, 277, (1947).

* MDDC—Manhattan District Declassified Report.

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Society.

PHOTOGRAPHS TAKEN DURING DELIBERATE IGNITION—BY CONTAMINATION WITH GREASE—OF A SMALL BAR- STOCK STEEL NEEDLE VALVE THROTTLING FLUO- RINE AT FOUR HUNDRED POUNDS PER SQUARE INCH.

Top:

REACTION!

Lower left:

CLOSE-UP OF DAMAGE TO
THE VALVE

Lower right:

DAMAGE TO THE BRICK AND
VALVE AFTER FOUR POUNDS
OF FLUORINE HAS ESCAPED.

THE END

THE ANALYTICAL LABORATORY

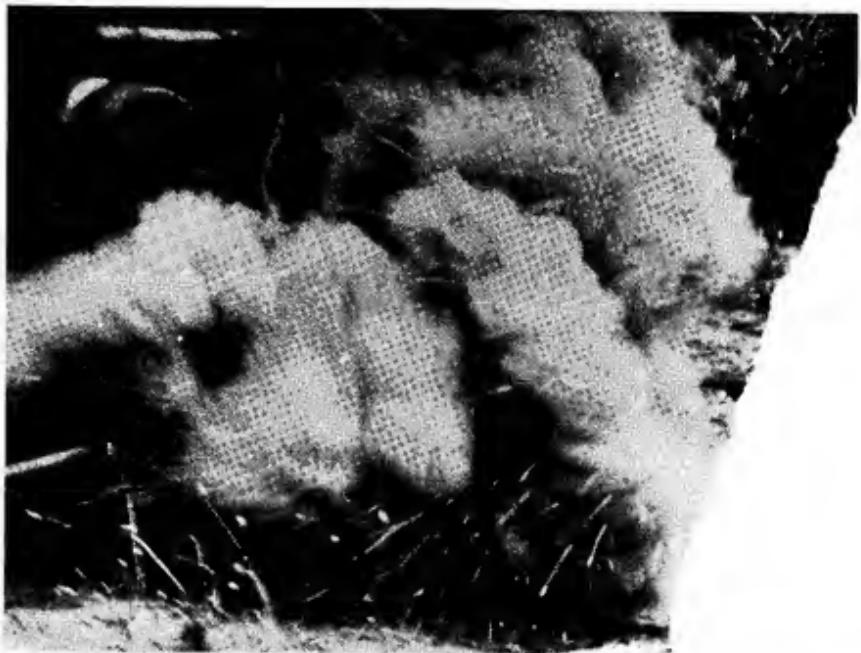
In the January issue, we ran six stories and the article; the result was, naturally, that votes ranged from 1 to 6, and the point scores are, in consequence, a bit higher than usual. Furthermore, the reader votes seem to have divided them into two groups; three stories got point scores of two-point-something; three got four-point-something. One thing it rather clearly demonstrates is that a short story has a hard, uphill fight to make first place—or even get near it! The short "minor classic" seemingly has a hard time getting the votes that way!

Anyway, here's the score on the January, 1949 issue.

Place	Story	Author	Points
1.	Players of \bar{A} (Conclusion)	A. E. van Vogt	2.16
2.	Red Queen's Race	Isaac Asimov	2.48
3.	Private Eye	Lewis Padgett	2.86
4.	Expedition Polychrome	J. A. Winter	4.06
5.	Death Is The Penalty	Judith Merrill	4.30

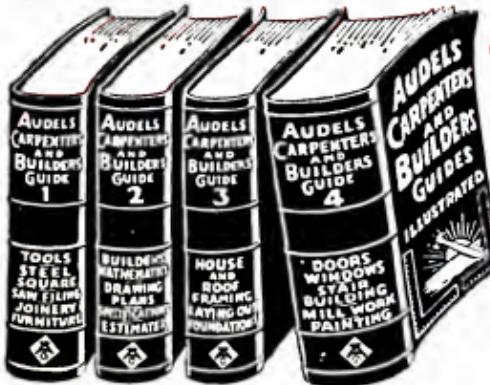
Apparently the longer a story lasts, the more fun you derive from it, and the better score it gets! And seemingly the answer to the question "How Can You Lose?" is "By being too short!"

THE EDITOR.



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